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PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOT--ETC(U)

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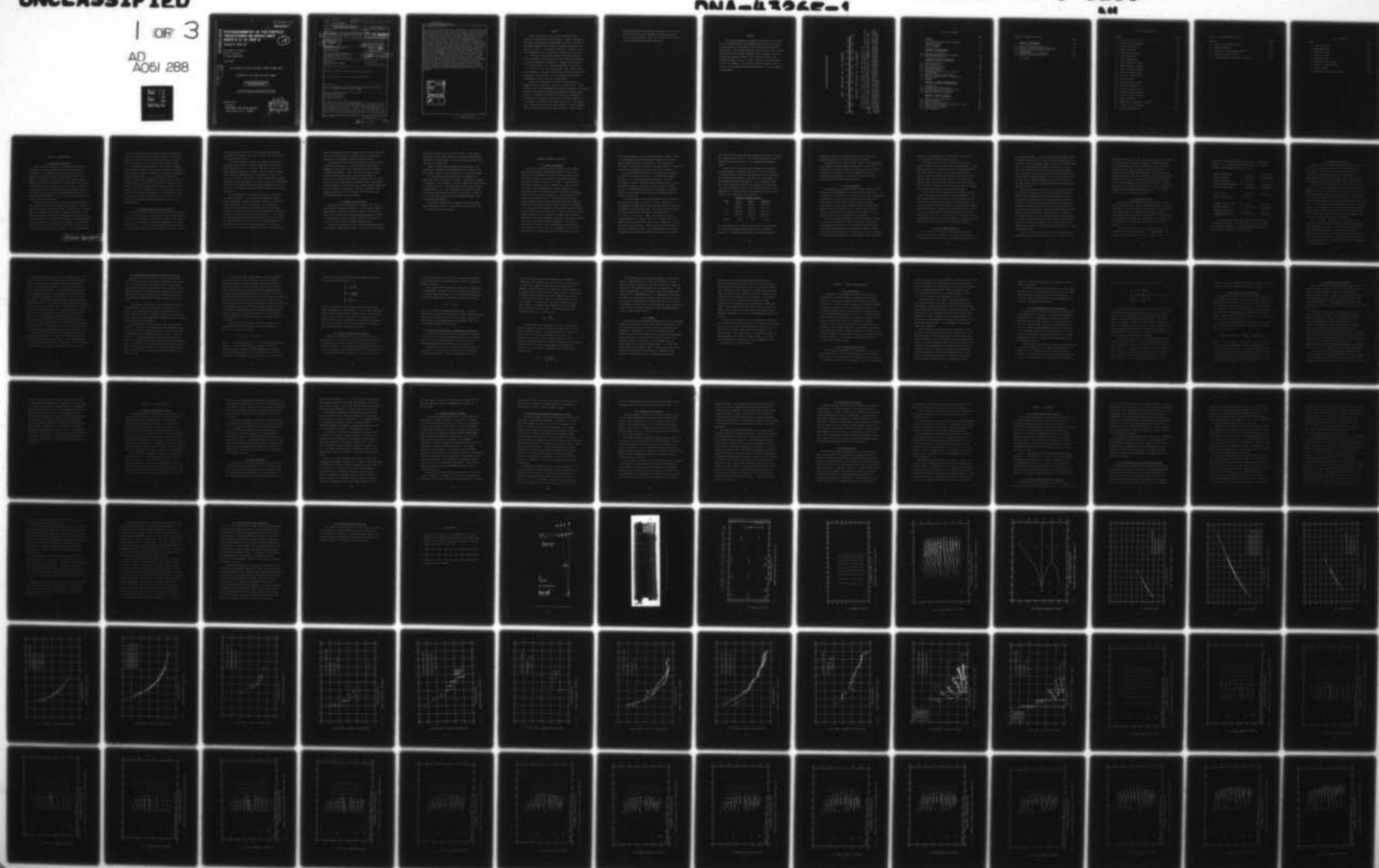

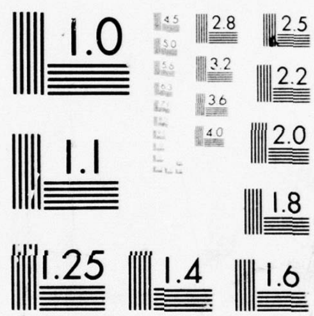

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PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOTS 8, 9, 10, AND 11

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Volume I – Shot 10

University of Victoria
British Columbia
Canada V8W 2Y2

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This report describes the photogrammetry and analysis of the particle trajectories in blast waves produced by the simultaneous detonation of pairs of spherical 1080 lb Pentolite charges. Four experiments were carried out. In two of the experiments one of the charges was positioned at a height of 25 feet above the ground and the second charge 50 feet above the first. In the other two experiments the corresponding distances were 15 feet and 30 feet.

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20. ABSTRACT (Continued)

For each charge configuration, one experiment was carried out over smooth ground and the other over rough ground. In each of the four experiments conducted, photogrammetrical measurements were made of the trajectories of air particle tracers (smoke puffs), which had been placed in a vertical grid at heights ranging from 3 feet to 58 feet above the ground and at radial distances ranging from 25 feet to 140 feet from the vertical axis through the charges. From the measured particle trajectories, calculations were made of the particle velocities, densities, hydrostatic overpressures, and dynamic pressures throughout the blast wave, at times ranging from 3 ms to 100 ms after detonation of the charges. Also determined from the photogrammetrical measurements were the shock front times-of-arrival. These were determined in each experiment for the primary shock front from each of the two charges; for the Mach stems produced above and below the interaction plane midway between the two charges, and for the Mach stem produced at the ground surface. From the shock front times-of-arrival, calculations were made of the shock velocities and, in turn, the peak particle velocities, air densities, and hydrostatic overpressures immediately behind each shock front. Calculations were also made of the variation with time of the particle velocity, density, hydrostatic overpressure and dynamic pressure at several fixed points. Results are presented both graphically and in tables, and are compared to results previously calculated for the same experiment using shock front photogrammetry and refractive image analysis.

SUMMARY

Owing to the bulk of the material presented, this report is divided into several volumes. Volume 1 introduces the series and presents and discusses the results for Shot 10. Subsequent volumes will present and discuss the results for Shots 8, 9 and 11. The method of analysis is common to all four experiments and is described in detail only in Volume 1.

So that the results from the four experiments may be easily compared, they have been scaled to remove the effects of varying atmospheric conditions. (Results are scaled to a 1 kg charge weight and a standard atmosphere of dry air at 15 °C at sea level.) For the most part, only scaled results are presented. Exceptions include some derived pressure-time histories, which are meant to be compared to actual gauge measurements made in each of the experiments.

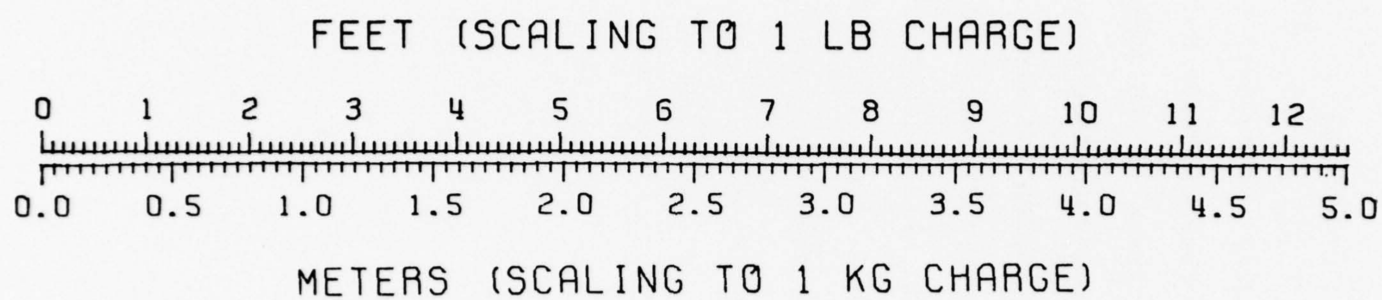
Results are presented in SI units, even though the experiments were originally laid out in British units. Only distance and time measurements are affected, however, as velocity, density, and pressure results are presented as dimensionless ratios. A distance units conversion scale is included for convenience, to convert between SI units (meters scaled to a 1 kg charge) and British units (feet scaled to a 1 lb charge), plus a time scale factor and scale factors to convert pressure ratios to both British and SI pressure units. Scale factors

which may be used to compute the distance and time values actually observed under the ambient conditions of each shot are also provided. Real pressure units are used for the results presented at gauge locations.

PREFACE

The authors gratefully acknowledge the opportunity offered by the Defence Research Establishment Suffield and the Defence Nuclear Agency to participate in the experiments described in this report. The analyses described here were carried out under contract with the Canadian General Electric Company, and with additional financial support from a research grant by the National Research Council (A 2952). The advice and assistance of Mr. A.P. Lambert, C.G.E. Project Officer at DRES, and Mr. J. Keefer, of the Ballistic Research Laboratory, is also gratefully acknowledged.

Unit conversion and scaling factors



For feet scaled to a 1000 lb charge, multiply the top scale by 10.

For time scaled to a 1000 lb charge, multiply time scaled to a 1 kg charge by 7.683.

For pressure in kPa, multiply a pressure ratio (in atmospheres) by 101.325. For pressure in psi, multiply the pressure ratio by 14.696. To convert kPa to psi, divide by 6.895.

To obtain distance values actually observed for Shot 10, in meters, multiply scaled values in this report by 8.0718. To obtain the observed distance values in feet, multiply the reported scaled values by 26.482. To obtain observed time values, multiply scaled time values by 8.3742. For observed pressures in kPa, multiply by 94.38; for observed pressures in psi, multiply by 13.69.

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CHAPTER 1, INTRODUCTION

1.1 Blast wave reflection

When a spherical charge is detonated above the ground surface the resulting spherical blast wave reflects from the ground. At a distance from the point on the ground immediately beneath the charge, approximately equal to the height of the charge above the ground, the reflected shock begins to overtake and combine with the primary shock to form a single shock known as the Mach stem. The point at which the primary shock, the reflected shock and the Mach stem meet is called the triple point. As time progresses and the Mach stem shock moves outwards, the triple point moves outwards and upwards in a curved trajectory.

The physical properties of the Mach stem blast wave and the trajectory of the triple point depend primarily on three things: the energy yield of the charge, the height of the charge above the ground, and the nature of the ground surface. When the primary shock reflects from the ground some energy will be absorbed and appear as seismic disturbances, including cratering if the explosion is close enough to the ground. As the blast wave continues to move across the ground surface there will be a continued transfer of energy between the air and the ground,

and also a redistribution of energy within the blast wave. Little is known about the transfer of energy to the ground from an air blast, or about the redistribution of energy within a blast wave as it passes over the ground surface.

In the experiments described in this report, attempts have been made to simulate the "ideal" reflection of spherical blast waves to provide a reference for studies of reflection by real ground surfaces. It is postulated that if two identical charges are simultaneously detonated at a certain distance apart, the two resulting identical spherical blast waves will interact along a plane, and since there will be no energy loss in this interaction it will be possible to observe an ideal spherical blast reflection. The properties of the Mach stems lying above and below the ideal reflecting plane may then be compared with those produced over various real ground surfaces.

1.2 General description of the project

The primary purpose of the project was to obtain information on the interaction of spherical blast waves from explosive sources with real and ideal reflecting surfaces. The results may be used, for example, to evaluate hydrodynamic air blast computer codes. The blast wave interactions were obtained by the simultaneous detonation of two identical spherical charges

placed one above the other, such that the distance between the charges was equal to twice the height of the lower charge above the ground surface.

Two different charge heights were used over two different types of ground surface. The four experiments were titled Dipole West Shots 8, 9, 10, and 11. For Shots 8 and 11 the lower charge was placed at a height of 25 ft above the ground surface and the second charge at an additional height of 50 ft above the first. Shot 8 was carried out over smooth ground and Shot 11 over rough ground. For Shots 9 and 10 the corresponding figures for charge height and charge separation were 15 ft and 30 ft. The ground surface was smooth for Shot 9 and rough for Shot 10.

Two photogrammetrical studies were carried out in each of these experiments. The first study involved the high speed photography against a suitable background, of the shock fronts produced by the two explosions. This permitted a calculation of the shock front trajectories and velocities, and thus a determination of the physical properties immediately behind the shocks as they moved into ambient air. The results of those calculations have been reported by Dewey et al (1975). The second project involved the high speed photography of an array of smoke puffs which acted as particle flow tracers, to determine the particle trajectories within the blast waves.

These trajectories have been analyzed to provide the space and time variations of particle velocity, density, hydrostatic overpressure, and dynamic pressure within the waves.

This volume describes the photogrammetry of the particle trajectories for Shot 10. The particle trajectory photogrammetry for the other three experiments will be reported in subsequent volumes. Shot 10 was analyzed first because the data collected were fewer than those collected for Shots 8 and 11 (fewer smoke puffs were used in Shot 10), and of better quality than those collected for Shot 9 (all smoke puffs detonated in Shot 10 and most remained visible throughout the time interval of interest). Thus the analysis of Shot 10 was carried out with a minimum of data processing and maximum expectation of useful results.

1.3 Description of Shot 10

Dipole West Shot 10 was fired on November 2nd, 1973 by the Ballistics Research Laboratories at the Defence Research Establishment Suffield, in Alberta, Canada. Two 1080-lb. spheres of Pentolite were detonated simultaneously, to within 5 microseconds, at nominal charge heights of 15 and 45 feet over a relatively rough (ploughed) ground surface.

Particle trajectory data were gathered by photographing the movement of smoke puffs formed in a vertical plane running

out from ground zero at 6.7° south of west. A WF5 camera operating at about 3400 frames per second was positioned 30 ft above the ground level at the main camera position 600 ft due south of ground zero.

Figure 1 shows a plan view of the field layout. The dashed line represents the approximate line of sight of the WF5 camera. Figure 2 shows the field of view of this camera.

The smoke puff grid was made up of 9 columns of 12 puffs each, hung vertically on strings. The vertical spacing of puffs was 5 ft, beginning 3 ft above ground level and ending at a height of 58 ft. The horizontal spacing of the columns of puffs was 10, 7 or 5 ft, depending on the distance from ground zero, beginning at about 25 ft and ending at about 85 ft. All 108 smoke puffs detonated successfully and a good film record was obtained.

This report describes the analysis of the smoke puff data collected for Shot 10, and presents and discusses some of the results of that analysis.

CHAPTER 2, METHOD OF ANALYSIS

2.1 Camera calibration

The exact orientation and lens position of the camera were determined using the measured positions in the film image of the photomarkers and other surveyed objects, such as pressure gauges. This calibration procedure has been described in detail by Dewey et al (1975). The positions of all fiducial markers, as they appeared in a chosen calibration frame, were transformed to a camera object plane in real space using the camera position, two camera orientation angles, and two "optical" parameters: a magnification factor and an axial rotation angle. The orientation angles and optical parameters were calculated so that the two reference point images in the calibration frame, P1 and P2, transformed to coincide with their positions in the object plane calculated directly from the field survey data. Since an exactly surveyed camera position was not provided, the three camera position coordinates were also calculated, together with the two orientation angles and the two optical parameters. The camera position "optimization" was accomplished by requiring that a third reference point image, P3, transformed to its object plane position as calculated from the survey data, and that

the distance between a pair of reference point images, P4 and P5, transformed to the corresponding distance in the object plane calculated from the survey data. The calibration procedure was iterative, and ended when the results of successive calculations differed by less than a pre-set tolerance.

The field survey data used in the calibration procedure for Shot 10 are listed in Table 1. The calculated camera position ($\pm$ 0.1 feet) and orientation angles ($\pm$ 0.001 °) are listed in Table 2, together with the positions of all the calibration points in the object plane and their "shifts", that is, the differences between the transformed calibration points and their object plane positions calculated directly from the survey data.

The object plane positions and shifts of the calibration points are also shown in Figure 3. Circles represent the transformed calibration points and squares represent positions calculated using the survey data. The larger circles indicate the three points that were made to coincide exactly, viz. P1 = W1, P2 = W3, and P3 = 300W1. The large half-circle indicates the final reference point (P5 = 300W2) used in the camera position optimization (P4 was set to equal P3). C1 and C2 denote the two charges. Frame centre is near the camera centering photomarker, VP2A. The photomarkers VP1A and VP1B show large shifts probably because they were not re-surveyed

after the pole on which they were mounted was lowered to replace the marker missing on Shot 8. No similar explanation could be found for the vertical shift of the foreground photomarker 300W2.

Consistency in calculating the optimum camera position from experiment to experiment was one of the criteria used in judging whether or not the optimum position was acceptable. The optimum camera positions used were the ones showing the least movement between experiments, on the assumption that the actual camera position was the same for each experiment. The calculated camera positions are shown below for the four experiments. Ground zero was given coordinates 2000 ft east, 2000 ft north, and 2316.32 ft elevation.

CALCULATED CAMERA POSITIONS

Shot	East	North	Elevation
8	2003.38	1385.09	2341.84 ft
9	2002.76	1385.15	2341.66 ft
10	2002.62	1388.29	2341.72 ft
11	2003.25	1386.89	2340.64 ft
Range	0.76	3.20	1.20 ft

The greater range in the north coordinates is probably due to the method of optimization used for this coordinate direction. The method was based on the apparent distance

between two points in the object plane rather than on the apparent position of one point in the object plane.

The position and orientation of a camera, once calculated, were assumed to remain constant throughout an entire film. The magnification factor and axial rotation angle were re-calculated for each frame in the data reduction part of the analysis described below, to account for frame-to-frame variations in the film projection optics.

2.2 Data reduction

The positions of the smoke puffs and two reference photo-markers as they appeared in the projected film image were digitized for each frame over a section of film that corresponded approximately to the duration of the positive phase of the blast waves. For the Shot 10 film, this time interval corresponded to frames 10 through 200 (frame 0 corresponded approximately to detonation time). Before each digitizing session, the projection system optics were aligned using a precision grid in the film gate of the projector.

The two reference markers used for the reduction of Shot 10 were P6 = VP3B and P7 = 300W2. The digitized data were transformed mathematically to the camera object plane using the image positions of these two reference markers in each frame and their positions in the calibration frame, to correct for frame-to-frame variations in image magnification and axial

rotation in the film projection optics and to correct for frame-to-frame effects of camera vibration.

The camera object plane was defined to coincide as nearly as possible to the actual plane of smoke puffs. Smoke puff positions in the object plane were then transformed to the actual smoke puff plane, which was assumed to be a vertical plane running from ground zero at an angle of 6.7° south of west. The coordinate system in this plane was defined to have its x-axis horizontal, its y-axis vertical, and its origin at ground zero. Thus the entire grid of smoke puffs was positioned in real space for each frame.

A time (after charge detonation) was assigned to each frame by computing the film speed at selected frames. Film speeds were computed using the 1 ms timing marks placed on the film at the time of its exposure. The reciprocal of a simple polynomial function fitted to the computed film speeds was then integrated to determine the successive frame times. Zero time was determined using the detonation zero timing mark placed on the film. This method of film timing has been described in detail by Dewey et al (1975). A complete set of timing data for the Shot 10 film is provided in Table 3.

2.3 The output data plane

The coordinate origin in the smoke puff plane was nominally ground zero. However, the coordinate origin was not located at the ground zero position which was listed with

the field survey data. The location used was instead a value corrected to account for the fact that the charges were not positioned in any experiment exactly above the surveyed ground zero. The smoke puff plane origin was defined to be that point which had the same elevation as the surveyed ground zero, but which lay directly below a point halfway along the line joining the charge centers. This corrected ground zero for Shot 10 was displaced horizontally by 1.2 ft from the surveyed ground zero, in a direction which was approximately 30° south of west.

Particle trajectory data were output in the smoke puff plane using an x-coordinate axis which was defined to run horizontally outwards from the corrected ground zero and a y-coordinate axis which ran vertically upwards from this same point, so that increasing x-coordinate values denoted increasing distance from an idealized vertical charge axis and increasing y-coordinate values denoted increasing distance above an idealized horizontal ground surface. All data in the smoke puff plane as they are presented in the figures of this report have x-coordinate values increasing to the right, so that the smoke puffs appear to run to the right of the charges rather than to the left as they appeared in the original photographic images.

Figure 4 shows the positions of the 108 detonated smoke puffs comprising the grid for Shot 10 at a time prior to the

detonation of the two charges. These positions are in the plane of the smoke puff grid and the charges, as described above. The smoke puff plane is not exactly parallel to the camera image and object planes (Figures 2 and 3), and various geometrical corrections were applied to make the transformation between them. The puffs enclosed in parentheses were not visible in the earlier film frames, but were seen later when they were illuminated by the light of the fireball. Charge positions in the figures are plotted as if they were positioned exactly above the corrected ground zero origin. The data shown in Figure 4 have not been scaled.

2.4 Scaling and units

The position-time histories of individual smoke puffs were extracted from the frame-by-frame positions of the smoke puff grid. This set of particle trajectories was then scaled to standard atmospheric conditions and charge weight to remove experiment-to-experiment differences due to variations in atmospheric conditions and charge weight. A change from British units to SI units was made at this stage of the analysis.

Particle trajectory data were scaled by dividing all distances by Sachs scaling factor $S = \sqrt[3]{(WP_o)/(W_oP)}$ and multiplying all times by the factor $C/(C_oS)$, where C is

the ambient sound speed computed for Shot 10. Data used to compute C and S, and define the scaled event, are listed below with the computed values of C and S.

Ambient temperature,	$T = -5.94\ ^\circ C$	($21.3\ ^\circ F$)
Ambient pressure,	$P = 94.38$ kPa	(13.689 PSI)
Relative humidity,	$RH = 81.0$ %	
Computed vapour pressure,	$VP = 0.32$ kPa	(2.4 mm Hg)
Ambient sound speed,	$C = 328.003$ m/s	(1076 ft/s)
Charge weight,	$W = 489.9$ kg	(1080 lbs)
Sachs scaling factor,	$S = 8.0718$	
Standard charge weight,	$W_o = 1.0$ kg	(2.2 lbs)
Standard pressure,	$P_o = 101.325$ kPa	(14.7 PSI)
Standard temperature,	$T_o = 15\ ^\circ C$	($59\ ^\circ F$)
Standard sound speed, (dry air)	$C_o = 340.292$ m/s	(1116 ft/s)

The results presented in this report therefore apply to a scaled event which is the detonation of two 1 kg charges in a standard atmosphere. The scaled heights of burst for Shot 10 were 0.563 meters and 1.713 meters.

2.5 Trajectory fitting

Figure 5 shows the scaled particle trajectory data for Shot 10 in the smoke puff plane with positions measured horizontally and vertically from corrected ground zero. Approximately 9600 puff positions are represented. As represented, the raw trajectory data have not been edited, and a number of obvious film reading errors can be seen.

The raw particle trajectory data were edited to remove obvious data processing errors, such as a single point widely displaced from its trajectory for one or two frames. The trajectories were then smoothed by fitting, for each puff in turn, simple polynomial expressions separately to both the x- and y-coordinate data, these being discrete functions of frame time. A least squares fitting technique was used. The adequacy of each fit was determined by examining on the same graphical output plots of both the raw trajectory data and the fitted curve. For Shot 10 this meant examining and adjusting 216 such plots, at least two or three times each.

For a given puff, the first step in fitting the raw trajectory data was to set the time of arrival of the shock front first hitting the puff. This was done subjectively, using the plotted raw data. The obvious constraint was used that this time for a single puff should be the same for the x- and the y-coordinates. Prior to this time of arrival, the measured positions of the puff were averaged to establish the initial puff position.

The raw trajectory data at times subsequent to the time of arrival were fitted with polynomial functions as described above. The fits were individually adjusted by varying the order of the polynomial and/or the relative weight given to each of the raw data points. The lowest order of polynomial which appeared to describe the particle trajectory was used. In all cases polynomials of fifth order or less were found to be adequate. Data points in obvious error were edited out by weighting them zero. For some puffs undergoing relatively more complex motions (i.e. those nearer to the charges), trajectories were fitted in two sections. If it appeared that the change in motion of the puff was the effect of a second shock wave, then it was not required that the first derivative of the fitting function (the velocity of the puff) be continuous. Otherwise it was required that this derivative at least appear to be continuous. In judging the motion of a particular puff, the motions of its near neighbours were also taken into account.

Using the fitted functions, the positions of the smoke puffs were interpolated at a series of discrete times, which were not necessarily the frame times. The first derivatives of the fitted functions were also calculated at the interpolated times for use in later calculations of particle velocity.

2.6 Regionalization and shock strength calculations

Knowing the time of arrival of a shock front at each puff, and the position of each puff, calculations were made of the shock trajectory, the shock velocity, and various peak parameters associated with shock front strength. These shock trajectories and associated peak parameters were then compared to the corresponding results calculated as part of the refractive image analysis already reported (Dewey et al, 1975).

To associate a shock radius with a given puff position, the smoke puff plane was divided into five regions. All puffs in a given region were assumed to have been first hit by the same shock front. The region boundaries were defined using triple point path measurements obtained from the refractive image analysis mentioned above.

The regions which were defined for Shot 10 are shown in Figure 6. In regions 1 and 2 the puffs were assumed to have been first struck by primary shock fronts, and the shock radii were measured from the appropriate charge center. Puffs in regions 3, 4 and 5 were assumed to have been first hit by a Mach stem: along the ground, and below and above the interaction plane, respectively. The interaction surface, along which the upper and lower primary shock fronts interact without energy loss, was assumed to be the plane of symmetry separating the charge centers.

In the two Mach stem regions adjacent to the interaction plane, radius values were measured from the point halfway between the charges, and in the Mach stem region adjacent to the ground surface they were measured from corrected ground zero. This was done in accordance with the assumptions that the Mach stem shock fronts were spherical and that the sphere centers remained fixed with time at the points where the vertical coordinate axis intersected the interaction and ground planes. Shock strength results computed in this way for Shot 10 represented an improvement over similar results computed using the assumption that the Mach stem fronts were cylindrically shaped and centered about the vertical coordinate axis. This question of Mach stem shape is discussed further in a later section of this report.

In each of the five regions, the shock trajectory data obtained from the first movement of the smoke puffs were fitted to a function of the form

$$r(t) = A + Bt + C \log(1 + t) \quad ,$$

where r is the shock radius, t is the time after detonation, and A, B, and C are the fitted coefficients. The shock velocities were calculated by differentiating this function. The peak particle velocity, V_s, peak density, D_s, and peak hydrostatic overpressure, P_s, in each of the five regions were

calculated as functions of shock radius, using extensions of the Rankine-Hugoniot equation, viz:

$$\frac{V_s}{C_a} = \frac{2}{\gamma+1}\,\frac{M^2-1}{M^2}$$

$$\frac{D_s}{D_a} = \frac{(\gamma+1)M^2}{(\gamma-1)M^2+2}$$

$$\frac{P_s}{P_a} = \frac{2\gamma}{\gamma+1}\,(M^2-1)$$

where C_a, D_a and P_a are the ambient values of sound speed, density and pressure, respectively; γ is the ratio of specific heats and M the Mach speed of the shock front. Peak particle velocity will be used in this report as a measure of shock strength because other independent calculations of this parameter were also made. Peak values of density and pressure were calculated using the above method only.

2.7 Particle velocity calculations

Assuming the smoke puffs to be perfect tracers of the gas flow within the blast waves, the gas particle velocities throughout the field of smoke puffs were calculated for a sequence of times. This was done by calculating the derivative of the polynomials used to interpolate the fitted trajectories. The derivatives of these polynomials were also calculated at

the times-of-arrival of the shock at each puff to provide a second measure of V_s, the peak particle velocity immediately behind the shock.

The peak particle velocities V_s were also calculated by a third method. At specific times the particle velocities, V, and the radial positions, r, of all the puffs within each of the five regions were fitted to a function of the form

$$V(r) = A + B^2 r \ ,$$

that is, a straight line with positive slope. (The data scatter did not justify the fitting of a more flexible function.) This fitted function, at each time and in each region, was extrapolated to the appropriate shock radius at that time to determine peak particle velocity.

2.8 Density and hydrostatic overpressure calculations

The particle trajectory data were also used to compute time varying air densities throughout the field of the smoke puff grid. The calculated densities were in turn used to compute hydrostatic overpressures in the same field.

The smoke puff grid of 9 columns of 12 puffs each was treated as a grid of 88 cells, each cell being defined by 4 adjacent smoke puffs. Each such quadrilateral cell was

viewed as representing the cross-section of an elemental volume defined by rotating the area of the cell about the axis of cylindrical symmetry rising vertically through the two charges. Conservation of mass within this volume demands that the product RAD is constant at all times, where R is the radial coordinate of the centroid of the cell defining the volume, A is the area of the cell, and D the average density of air in the volume. In particular, the product RAD must always equal $(RAD)_a$, its ambient value computed before the arrival of any shock fronts at the cell. This equality gives the relative density D/D_a at any time, as

$$\frac{D}{D_a} = \frac{(AR)_a}{A\ R}$$

Pressure values were calculated using the fact that P/D^{γ} remains constant as long as the entropy of the gas in a cell remains constant, where P is absolute pressure at a point, D density, and γ the ratio of specific heats of air. In particular, the value of P/D^{γ} equals the value $P_s/(D_s)^{\gamma}$ measured immediately behind the leading shock front, and remains constant until the entropy is changed by the arrival of a second shock. The relative overpressure at a point can be computed using

$$\frac{P}{P_a} - 1 = \frac{P_s\,(D/D_a)^{\gamma}}{P_a\,(D_s/D_a)^{\gamma}} - 1$$

The values P_s/P_a and D_s/D_a were computed at each puff's position immediately after it was first struck by a shock front, taking P_s and D_s from the shock velocity data computed according to the method described earlier (section 2.6). The values computed for P_s/P_a and D_s/D_a at the cell corners were averaged. The overpressure $P/P_a - 1$, subsequently calculated, therefore also represents an average value over a given cell. The arrival of shock fronts subsequent to the first could not be detected accurately, so that no attempt was made to determine exactly those times after which the calculated overpressures in given cells became invalid.

2.9 Summary

Previous sections describe the method of particle trajectory analysis by which data of four basic types were obtained: times of shock front arrival, particle velocities, densities and hydrostatic overpressures. To obtain a measure of shock strength the particle trajectory data were analyzed in separate groups according to the shock front which first arrived at the smoke puffs in each group. It was assumed that the shock fronts had a specific regular shape. In this way the smoke puffs at the observed times of shock front arrival were assigned radial position coordinates to supplement their measured Cartesian coordinates. Radial shock velocities

throughout the smoke puff grid were computed and peak particle velocities were derived from the shock velocities. These peak velocity values were used as a measure of shock front strength and were compared with values obtained using smoke puff data in two other ways, and with values obtained previously using refractive image analysis. The particle trajectory analysis depended on the refractive image analysis only to define the five regions in the smoke puff plane. These regions were used only in the analysis of the shock fronts and were of no particular significance in the subsequent analysis of the smoke puff trajectories behind the shocks.

The basic data obtained from the smoke puff trajectories after shock front arrival were derived in Lagrangian coordinates, that is, for a grid of points which moved with the air in the blast wave and did not remain fixed with respect to the ground surface. The method used to transform these data to Eulerian coordinates, that is, fixed in space, and which also permitted the calculation of dynamic pressure fields, is the subject of the next chapter.

CHAPTER 3. SURFACE REPRESENTATION

3.1 Introduction

Measurement of the smoke puff positions permitted the determination of several physical properties of the blast waves in a vertical x-y plane passing through the corrected ground zero. Letting z denote values of a particular physical property at a specific time, the results of the particle trajectory analysis may be viewed as sets of discrete points on three-dimensional surfaces, $f(x,y,z) = 0$. If such surface representations are made explicit, they may be used to interpolate z-coordinate values, i.e. values of the physical property, at x-y positions other than the actual smoke puff positions, such as gauge locations. Such surface representations also may be used to display graphically an entire set of physical properties in the form of contour lines joining points of equal z-value. The following sections describe how the various surfaces were fitted.

3.2 Preliminary interpolations

Source data (z-coordinates) for surface fitting were the times-of-arrival of the first shock front at the individual smoke puffs, the measured particle velocities at puff positions at a sequence of times (velocity fields), and average densities

at cell centroids at the same sequence of times (density fields). Values of hydrostatic overpressure at the cell centroids were also fitted, these values being derived from the density data, as described previously. The x-y coordinates were the initial puff positions, the puff positions at a time, t , and the cell centroid positions at a time, t .

The first step in the surface fitting procedure was the completion of the data grid. This meant generating x-y coordinates to represent "missing" puffs and cell centroids, and interpolating z-coordinates at these new positions. This was done in a very conservative manner, using linear interpolation in a domain bounded by the completely convex set of straight line sections which connected the outermost of the originally existing puffs. No extrapolation beyond this domain was attempted.

The positions of missing puffs were assigned by interpolating x- and y-coordinates in turn, between those of the adjacent puffs in each missing puff's row and column. The z-data assigned to the new positions were then interpolated along the row and along the column, and the two results were averaged. New z-coordinates were assigned only to new puff locations that fell inside the original domain boundaries. A new puff position on the domain boundary, that is a puff with only one nearest neighbour in its row or column, was given a position coordinate and a z-coordinate equal to

those of its single neighbour in the appropriate row or column calculation.

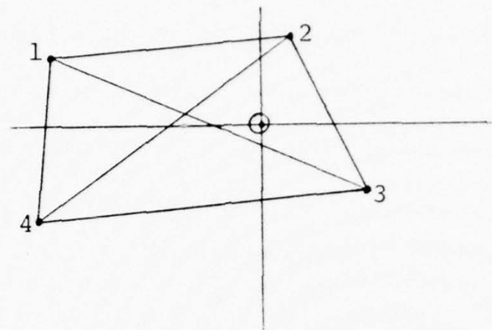
In Shot 10 there were no missing puffs in the original grid and it was not necessary therefore to apply the above technique when fitting the time of arrival surface. In all other cases, missing puff data were generated only to expedite subsequent interpolations.

3.3 Interpolation onto an Eulerian grid

The second step in the surface fitting procedure was the definition of a rectangular grid and the subsequent interpolation of a z-coordinate value at each new grid point inside the original domain. In all cases the new grid was a regular square grid with a constant mesh size of 0.1 m, which was approximately one-half the mesh size of the original smoke puff grid after scaling. The new grid was in the same plane as the smoke puffs but, unlike the smoke puff grid, it remained stationary relative to the coordinate origin.

Interpolation at the new grid points was done by fitting a polyhedral surface to the original, completed smoke puff grid. This was done by fitting plane surfaces to triplets of data at the corners of the original smoke puff cells. For example, when a new grid point fell inside an

original cell of smoke puffs (1,2,3, and 4) as shown:



a z-coordinate value was assigned to the new grid position "ϕ" by fitting planes to the puff data at 1, 2, and 3, and at 2, 3, and 4, and interpolating at the new grid point using each plane in turn, and averaging the two results. If, at the edge of the domain, a cell was defined by only three puffs, only one interpolation plane was used. When two or more cell corners were beyond the domain, no data were interpolated to the new grid. In this way the original domain boundaries were shrunk, and made concave, on occasion.

The surface represented by the resulting grid of interpolated data was therefore an array of connected triangular plane elements, with four such elements for each complete smoke puff cell. The connected array was everywhere continuous in z, albeit discontinuous in the derivatives of z across the connections, and it passed through all of the original smoke puff data. There was therefore no smoothing of the

original data, and no chance of excessive values of z between original data due to uncontrolled fitting functions.

3.4 Dynamic pressure calculations

Surfaces were fitted to the times of shock arrival at each smoke puff and to the particle velocities, densities and hydrostatic overpressures at a sequence of times. The grids were Eulerian in that their position in the x-y plane did not change with time. The z-coordinates were, specifically, the velocity vector magnitudes expressed as Mach numbers, density ratios relative to ambient density, and overpressure ratios relative to ambient pressure.

Since the same interpolated grids were used for velocity and density, the dynamic pressure at each grid point also could be computed using

$$\text{dynamic pressure ratio} = \frac{\frac{1}{2}D|V|^2}{P_o} = \frac{\gamma}{2}\left(\frac{D}{D_o}\right)\left(\frac{|V|}{C_o}\right)^2$$

where $\gamma = 1.4$, (D/D_o) is the measured relative density, $(|V|/C_o)$ the measured particle velocity Mach number, P_o the standard pressure, and C_o the standard sound speed. Dynamic pressures could not be calculated prior to this point in the analysis because the original, uninterpolated values of relative density and particle velocity were not measured at the same set of points in the x-y plane.

3.5 Contours and time histories

The fitted surfaces described above were used only for interpolation; the data were not smoothed. Interpolation onto an Eulerian grid made possible the calculation of dynamic pressure fields. Further interpolation to points inside the Eulerian grid made it possible to compute and plot contour lines over the various data fields, and also time history curves for data at specific fixed locations within those fields.

The contours calculated were those of equal time of shock arrival (isochrones), particle velocity (isotachs), density (isopyknics), hydrostatic overpressure (static isobars), and dynamic pressure (dynamic isobars). The isochrones represent the shock front shapes at different times. The contouring technique therefore provided a complete mapping of all the physical properties of the blast wave within the smoke puff domain without reference to other measurements. The time histories of these physical properties at several fixed locations were also calculated. Some of these were calculated at pressure gauge positions in unscaled units, so they may be compared to actual gauge measurements.

Contours of specific z-values were calculated using linear interpolation, searching between pairs of grid points along the Eulerian-Cartesian grid lines and along the mesh diagonals for possible contour line intersection points, and

joining the points which were found. Time history curves were calculated by interpolating z-values at a fixed location in a time-series of data fields which had been interpolated onto the same Eulerian grid. The interpolations to points inside this common grid were of the polyhedral surface type describe previously. Because all fitted surfaces were continuous in z and because the mesh size could be made relatively small, satisfactory contours and time histories were obtained. Because the fitted surfaces were smooth (comparitively speaking) and, in the limit of an infinitely small mesh, they would pass through all the control points in the measured data fields, the contours and time histories were smooth and represented the measured data faithfully in all cases.

CHAPTER 4. SHOT 10 RESULTS

4.1 Times of shock front arrival

The measured initial puff positions, the times of first shock arrival, and the peak particle velocities obtained by differentiating the functions fitted to the particle trajectories are presented in Table 4. Puff position is given relative to corrected ground zero as origin with horizontal and vertical axes. Puff position and the time of arrival of the first shock are given both as observed and scaled. Particle velocities listed are derivatives of the fitted puff trajectories at the times of shock arrival, and are expressed in Mach units. Expressed this way, the particle velocities are the same scaled as unscaled. Also listed are the initial radial puff positions (scaled) and region codes.

Shock front data determined from the first movement of the smoke puffs, i.e. calculated from the time-of-arrival data in Table 4, are listed in Tables 5.1 - 5.5. Each table corresponds to one of the 5 regions used. Listed are the observed and fitted unscaled shock trajectory data, the scaled fitted shock trajectory data, and the computed shock velocities and peak parameters associated with shock front

strength: peak hydrostatic overpressures in atmospheres and in kilopascals, peak particle velocities in Mach units, and peak density ratios. Given as ratios, these peak parameters are the same scaled as unscaled. Pressure given in kilopascals in the tables refers to the unscaled (observed) case only.

The shock front radius versus time data derived using particle trajectory analysis (PTA) are also shown in Figures 7.1 - 7.3 for the two primary fronts, the two Mach stems at the interaction plane, and the ground Mach stem, respectively. They are compared to corresponding data derived from refractive image analysis (RIA) reported by Dewey et al (1975). The refractive image analysis results were obtained using photogrammetry against a striped canvas backdrop and they describe the shock as it travelled in a direction almost diametrically opposite to the direction of the smoke puff grid.

4.2 Shock strengths

Peak particle velocities calculated from shock front velocities are shown in Figures 8.1 - 8.3 for the primary fronts, interaction Mach stems, and the ground Mach stem. This method of determining peak particle velocities has been labelled method 1, and the data plotted correspond to

those listed in Tables 5.1 - 5.5. The results in the figures are compared with those previously obtained using refractive image analysis (RIA). In the case of the primary shock fronts, results are also compared to those of Brode (1957) for TNT.

Peak particle velocities calculated as the derivatives of the fitted particle trajectory functions at the time of shock arrival are shown in Figures 9.1 - 9.3, labelled method 2. Corresponding numerical data are listed in Table 4. Results are compared to Brode in the primary front case, and with the results of method 1 in the Mach stem cases.

Peak particle velocities calculated by fitting particle velocity as a function of radial position in a region at a fixed time, and extrapolating to the shock radius at that fixed time (method 3), are shown in Figures 10.1 - 10.3. The corresponding numerical data are listed in Tables 6.1 - 6.5. Peak particle velocities are compared to Brode in the primary front case, and to method 1 results in the Mach stem cases.

Some of the data from which the method 3 results were extrapolated are shown in Figure 11.1. Shown are the magnitudes of the particle velocity vectors throughout the blast wave in the regions of the Mach stem regions above and below the interaction plane. Results are plotted versus a radial coordinate computed in the same manner as for the time-of-arrival results. Also shown are the straight line fits to the data, extrapolated to the shock front radius at each of

the times shown. Figure 11.2 shows similar results for the primary shock front regions, compared to the results of Brode for TNT.

4.3 Particle velocity fields

The calculated particle velocities in the plane of the smoke puffs are shown as vectors in Figures 12.1 through 12.23 for times between 0.4 and 1.0 ms in 0.1 ms increments, and for times between 1.0 and 6.5 ms in 0.5 ms increments. The particle velocity field is shown at several other intermediate times to illustrate certain columns of smoke puffs being struck by the advancing shock fronts. All times and positions are scaled to a 1 kg charge in a standard atmosphere. *Position coordinate axes extend horizontally* and vertically from the corrected ground zero. The charge positions are also shown. The particle velocity vectors represent the derivatives of the smoothed particle trajectories, and their magnitudes may be judged using the standard vector shown on each figure. All velocities are measured in Mach units, relative to the standard sound speed. Puffs not yet struck by a shock wave are represented by small circles (zero velocity).

Numerical data corresponding to Figures 12.1 - 12.23 are listed in Tables 7.1 through 7.16, along with scaled radial positions of the puffs, and region codes as defined in Figure 6.

Conversion factors are given at the foot of each table, which may be used to convert the scaled data in the tables and figures back to their original unscaled values.

4.4 Density and hydrostatic overpressure fields

Calculated average relative densities throughout the smoke puff plane are depicted graphically in Figures 13.1 - 13.23, for times between 0.4 and 1.0 ms in 0.1 ms increments, and between 1.0 and 6.5 ms in 0.5 ms increments. The average density field is shown at several other intermediate times to illustrate the transition of certain cell columns through their periods of peak density. All time values are scaled. Cell positions are scaled and are given relative to the corrected ground zero as origin with horizontal and vertical axes. Charge positions are also shown. The calculated densities may be judged using the density shading scale shown on each figure. Density is given as a ratio, relative to ambient density. Cells not yet struck by a shock wave and cells in which the density has dropped to a value less than ambient density are shown blank.

Corresponding numerical data are listed in Tables 8.1 - 8.8 along with radial cell positions computed according to the regions defined previously. Numerical data describing the fields of hydrostatic overpressure are similarly listed in Tables 9.1 - 9.8. The pressure results for a given cell were obtained by multiplying the density results for that cell by

a factor determined by the strength of the shock which first traversed the cell, but which did not vary with time.

4.5 Times-of-arrival surface

Figure 14 shows a perspective view of the surface fitted to the original smoke puff positions and the observed times of first shock front arrival, i.e. to the data listed in Table 4. The grid mesh size is 0.1 by 0.1 meters (scaled), about 2.5 feet square (unscaled), or about 1/2 that of the original smoke puff grid. The charge positions are indicated on the vertical distance axis.

The times-of-arrival surface is smooth enough to permit contouring and the contours in this case (isochrones) represent shock front shapes at different times. These contours are plotted in Figure 15. The times-of-arrival surface was not smooth enough to permit the calculation of gradient vectors which could be used to compute shock velocity vectors and shock strengths over the new grid.

Two attempts were made to obtain contours of shock strength. In the first, the times-of-arrival surface was smoothed by least-squares fitting low-order, one-dimensional polynomial functions to the time-of-arrival data along each grid row and column separately, and computing the derivatives of the fitted functions to obtain the associated components of the surface

gradient vectors. Shock velocity vectors were obtained from the time-of-arrival gradients, and from these peak particle velocities were computed. The peak particle velocity (shock strength) surface is shown in Figure 16. The contours of this surface (not shown) did not exhibit any discontinuities across the boundaries of the shock front regions, as they would if surfaces were fitted to the times of arrival in each region separately.

The results of the second method used to compute shock strength contours are shown in Figure 17. These were obtained by interpolating an average shock radius at each value of peak particle velocity shown, for each shock front region in turn, using a composite of the various peak particle velocity versus radius curves shown in Figures 8 through 10. Arcs of circles with these radii, centered on the appropriate points along the vertical charge axis, were then drawn in the regions to represent shock strength contours. These peak value contours are discontinuous across triple point locii and other region boundaries. As.a result, some horizontal lines are crossed twice by the same contour or, in other words, identical shock strengths can be found at two locations the same vertical distance from a reflecting surface, but at different radial distances from the vertical charge axis. Examples are illustrated in the figure.

4.6 Field surface contours

Contours of equal particle velocity, density, hydrostatic overpressure, and dynamic pressure in the blast waves were determined for a series of times, using surfaces fitted to the various measured data fields at those times. Sample results are shown in Figures 18 through 21 at scaled times of 2.5 ms and 4.0 ms. The shock fronts shown in these figures are obtained from the time-of-arrival surface (as were those in Figure 15). Field contours such as those shown can be drawn for any scaled time between 0.5 ms and 6.5 ms. It should be re-stated that all of these results were obtained from the photography of the smoke puffs only and do not rely on the results obtained using the refractive image analysis (Dewey et al, 1975).

4.7 Time histories

By mapping the physical properties of the blast waves at short time intervals it was possible to determine the time histories of these properties at any selected fixed position within the smoke puff grid. This was done at 12 fixed locations, three in the two primary regions and three in each of the three Mach stem regions, as shown in Figure 22. At each distance from the axis of the charges in the Mach stem regions, each of the time history stations is the same distance from either the interaction plane or the ground plane. Particle velocity time histories could be interpolated closest to the ground level

because these were measured at puff locations, whereas the density and pressure data were measured at cell centers.

Time histories of particle velocity, density, hydrostatic and dynamic overpressure at these locations are given in Figures 23 to 26.

Also plotted with the time histories are the interpolated values of the time of arrival of the first shock front at the stations. The height of this time-of-arrival line represents a peak value derived from the shock velocity analysis.

Time histories for hydrostatic and dynamic pressure are also plotted in Figure 27.1 to 27.7 for stations at the nominal positions of field-mounted pressure gauges on the "60 foot gun barrel". The gauges on this gun barrel were mounted at nominal elevations of 10, 15, 20, 27, 30, 33, and 40 feet. The time histories at these locations are given in unscaled units in order to facilitate comparisons with the gauge measurements.

The dynamic pressures plotted in figures 26 and 27 are maximum values, computed using both the x and y components of particle velocity. Similar plots were made of the horizontal components of dynamic pressure, but the differences were not significant since the y components of particle velocity at these locations were small. Other locations could have been chosen at which the y components would not have been insignificant.

CHAPTER 5. DISCUSSION

5.1 Choice of Dipole West Shot 10

The results presented in this report were obtained from an original attempt to analyze an array of discrete two-dimensional particle trajectories within a blast wave. (During the preparation of this report Suffield Special Publication No. 71, by John Anderson was published, which also describes a blast wave two-dimensional particle trajectory analysis using somewhat different techniques to the ones presented here.) Previous analyses of blast wave particle trajectories were limited to those cases in which it could be assumed that the motion of the particles was rectilinear (Dewey, 1964; 1971).

Particle trajectory photogrammetrical measurements were made on Dipole West Shots 8, 9, 10 and 11, and it was decided to develop the two-dimensional analytical techniques using the measurements from Shot 10 because in this experiment a smaller number of smoke puffs had been used, and these puffs had formed with a high degree of success so as to produce an almost always complete rectangular array of particle tracers.

5.2 Particle trajectory analysis technique

The simplest possible techniques were used to analyze the particle trajectories obtained for Shot 10. The trajectory

of each puff was described by least squares fitting a low order polynomial to the time variation of both the x and y coordinates of the puff. The two polynomials obtained in this way could be differentiated at any point to give the particle velocity components, and interpolated to give the particle position at any time. The gas density within the blast wave was determined by using the positions of four adjacent puffs to define a quadrilateral cell. The resulting density is thus an estimate of the average density within the cell, the position of which is described by its centroid.

This analysis system considers each smoke puff in isolation, and although some smoothing of the data is achieved by the least squares fitting, no account is taken of the positions of adjacent puffs. Subsequently linear interpolation is used between the smoke puff positions so as to obtain a complete mapping of the blast wave properties throughout the domain of the smoke puff array.

5.3 Reliability and accuracy of the measurements

An attempt has been made in this report to evaluate the reliability of the particle velocity and density measurements obtained from the analysis of the time resolved smoke puff trajectories. This is not easy to do since there are no similar measurements with which the results can be compared. However, the particle trajectory results have been compared

with the peak shock front values obtained from the refractive image shock velocity measurements (Dewey et al, 1975). Also, hydrostatic and dynamic pressure results obtained from the particle trajectory analysis are presented for positions at which pressure gauges were mounted so that a direct comparison of the pressure-time histories will be possible.

Comparisons with the peak values at the shock front are not completely valid because the particle trajectory analysis method does not give results at the shock itself but only in the blast flow behind the shock. This necessitates extrapolating the particle trajectory data to the expected position and time of arrival of the shock. Extrapolation is rarely reliable and in the technique described as method 3, extrapolation was applied to data gathered from a large region of the blast wave and which thus showed significant scatter.

In order to calculate shock velocities assumptions were made about the shapes of the shock fronts. In the case of the primary shocks the assumption of sphericity appears to be valid. The shape of the Mach stem shock is still an open question. In the refractive image analysis (Dewey et al, 1975) the Mach stem shock positions were measured as close as possible to the reflecting surfaces and the assumption of cylindrical symmetry appears to have been valid. However, in the analysis of the smoke puff trajectories, measurements

could not be made so very close to these reflecting surfaces. It was clearly seen that the Mach stems were not cylindrical and as a first approximation it was assumed that these shocks were spherical with the centre at ground zero, or at the equivalent point on the ideal reflecting surface. This assumption gave results which were internally consistent, but it is clear that an investigation of the shape of the Mach stem shocks produced by a spherical shock reflecting from a plane surface, is a matter of urgency.

Three methods of calculating shock strength are described. The first uses the time of arrival of the shock front at the smoke puffs within a given region and analyzes these data in the same way as for the shock front refractive image photogrammetry described by Dewey et al, 1975. These results (PTA) are compared with the refractive image (RIA) results in Figures 8.1 to 8.3. There seem to be some significant differences between the results of the two measurement techniques: in particular the lowering of the Mach stem shock strength over the rough ground compared with the ideal reflecting surface is not so apparent when measured using the particle trajectory technique. This is probably due to the fact that the refractive image measurements were made within 0.3 m of the rough ground surface whereas the particle trajectory time-of-arrival measurements were made throughout the Mach stem region up to a distance of 4 m from the ground. Also,

the two sets of results describe the shock fronts travelling in opposite directions from the charges.

The second method of calculating peak particle velocities (shock strengths) used the derivatives of the two polynomials fitted to each particle trajectory, evaluated at the estimated time of shock arrival. Differentiation of a fitted polynomial at the extreme end of the observed data range is of questionable validity, and as might be expected the results plotted in Figures 9.1 to 9.3 show a considerable amount of scatter. This scatter is, however, uniformly distributed about the expected curve.

The peak particle velocities were also calculated by fitting all particle velocities in a region as a function of radial position in the region at a fixed time, and extrapolating to the shock radius at that time. Because of the scatter in the data obtained throughout the region, fitting the results to a curve of higher than first order did not seem justified. The results of these extrapolations are shown in Figures 10.1 to 10.3.

Although the extrapolation of the particle trajectory data beyond its domain of validity has produced a large degree of scatter, the peak particle velocity results are generally consistent with the results calculated using the method of refractive image analysis.

An attempt has been made to estimate the inherent accuracy and reliability of the particle trajectory measurements. A smoke puff typically has a diameter of about 0.3 m, and it is estimated that the centre of such a puff is identified with an accuracy of approximately ±0.1 m. This leads to an estimated maximum error in particle velocity of ±0.008 m/ms (±Mach 0.035), and an average density ratio of ±0.35. The mean peak particle velocity and density ratio measured in this experiment were approximately Mach 1 and 2.5 respectively, and so it is estimated that the accuracy of the reported results is approximately 5% for particle velocity and 15% for density ratio.

Dynamic pressure ratios were computed from the velocity and density results and are estimated to be accurate to within about 20%. Hydrostatic pressure ratios were computed using the density results and the peak overpressures computed from the shock velocities. Because the shock velocity data depended on region definitions and, in the case of Mach stems, on assumed shock front shapes, the accuracy of the hydrostatic overpressures computed behind the shock fronts is the most difficult to judge. Hydrostatic pressure ratios computed using cylindrical and spherical Mach stem shapes differed by as much as 10%. Combining this maximum figure with the estimated uncertainty given above for densities, it is estimated that the inaccuracy of the hydrostatic overpressures reported may be as high as 25%.

5.4 Surface mapping and contouring

The initial analysis of the smoke puff positions measured from the films provided a measure of the particle velocity of each smoke puff and the average density in each cell of four adjacent puffs. Chapter 3 described the use of linear and planar interpolation between the discrete values of particle velocity and density so as to provide a complete mapping of the parameters in the x-y plane, at any specified time. From such mappings, various contours were drawn to connect points having the same parameter value. In addition, from sequences of such mappings it was possible to determine the time histories of the parameters at several fixed positions within the smoke puff array.

A considerable amount of information is obtained from the analysis of the particle trajectories, and it seems clear that contour mappings and time histories best display this information. The contours can be compared easily with similar results from computer code predictions of the blast properties, and the time histories of hydrostatic and dynamic pressure can be readily compared with gauge measurements. To facilitate future comparisons the contours can be mapped at any specified time during the passage of the blast wave, and the time histories can be calculated for any specified position within the smoke puff array. Such outputs will be provided on request.

5.5 Dynamic pressure corrections

The dynamic pressure presented in this report is defined as one half the local gas density times the square of the maximum velocity component. In comparing these results with total head gauge measurements, compressibility corrections should be applied in the higher velocity regions.

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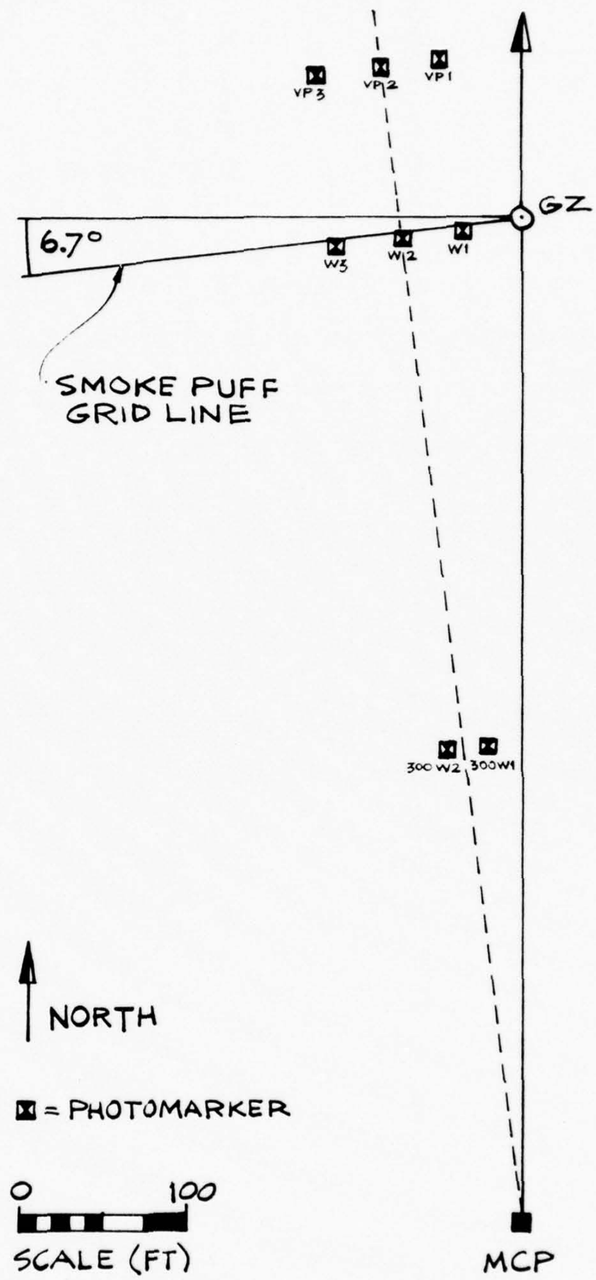

Fig. 1 Plan view of test site, Dipole West/10

Fig. 2 Field of view of camera, Dipole West/10

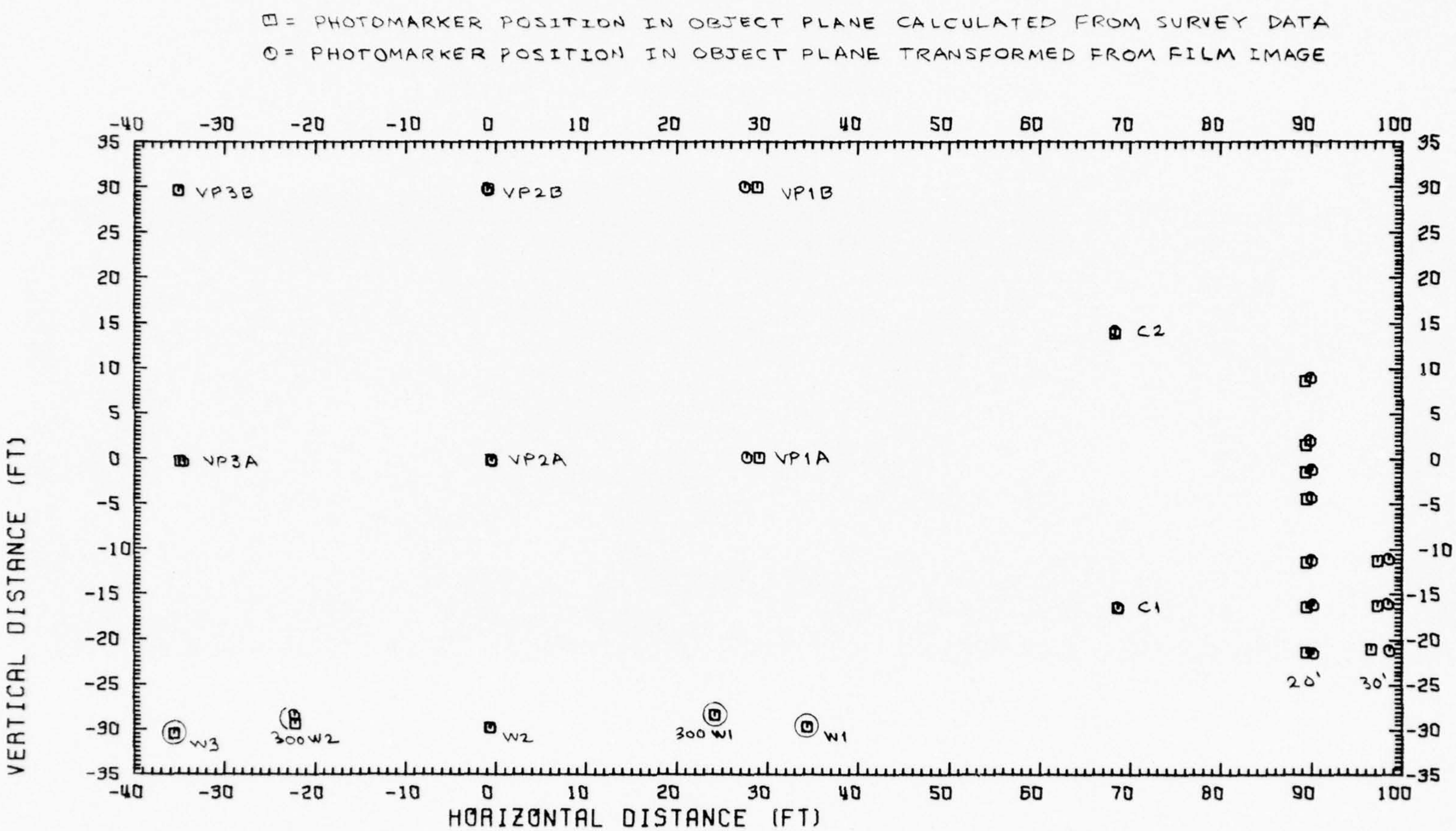

Fig. 3 CAMERA CALIBRATION, DIPOLE WEST/10

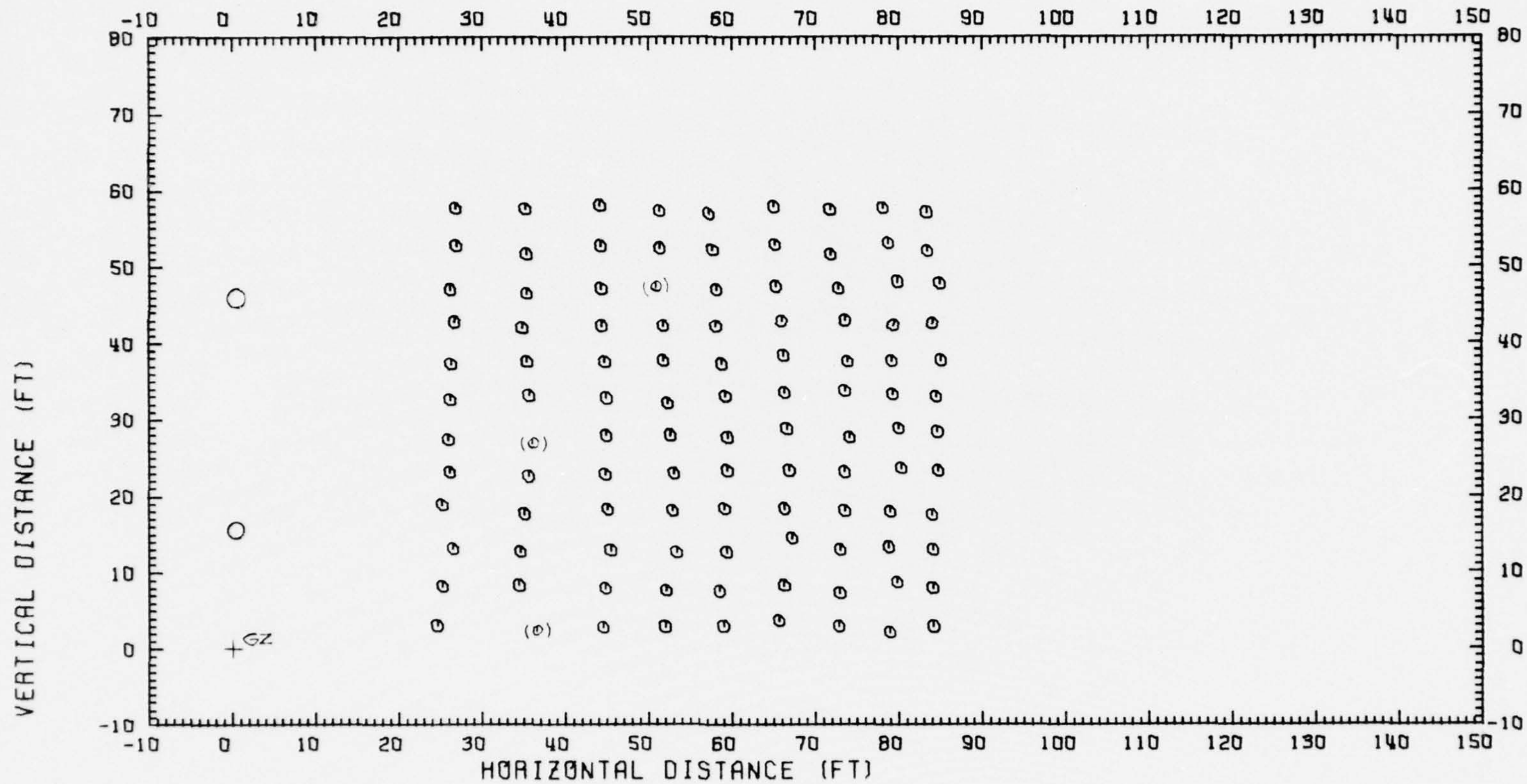

Fig. 4   SMOKE PUFF GRID, DIPOLE WEST/10

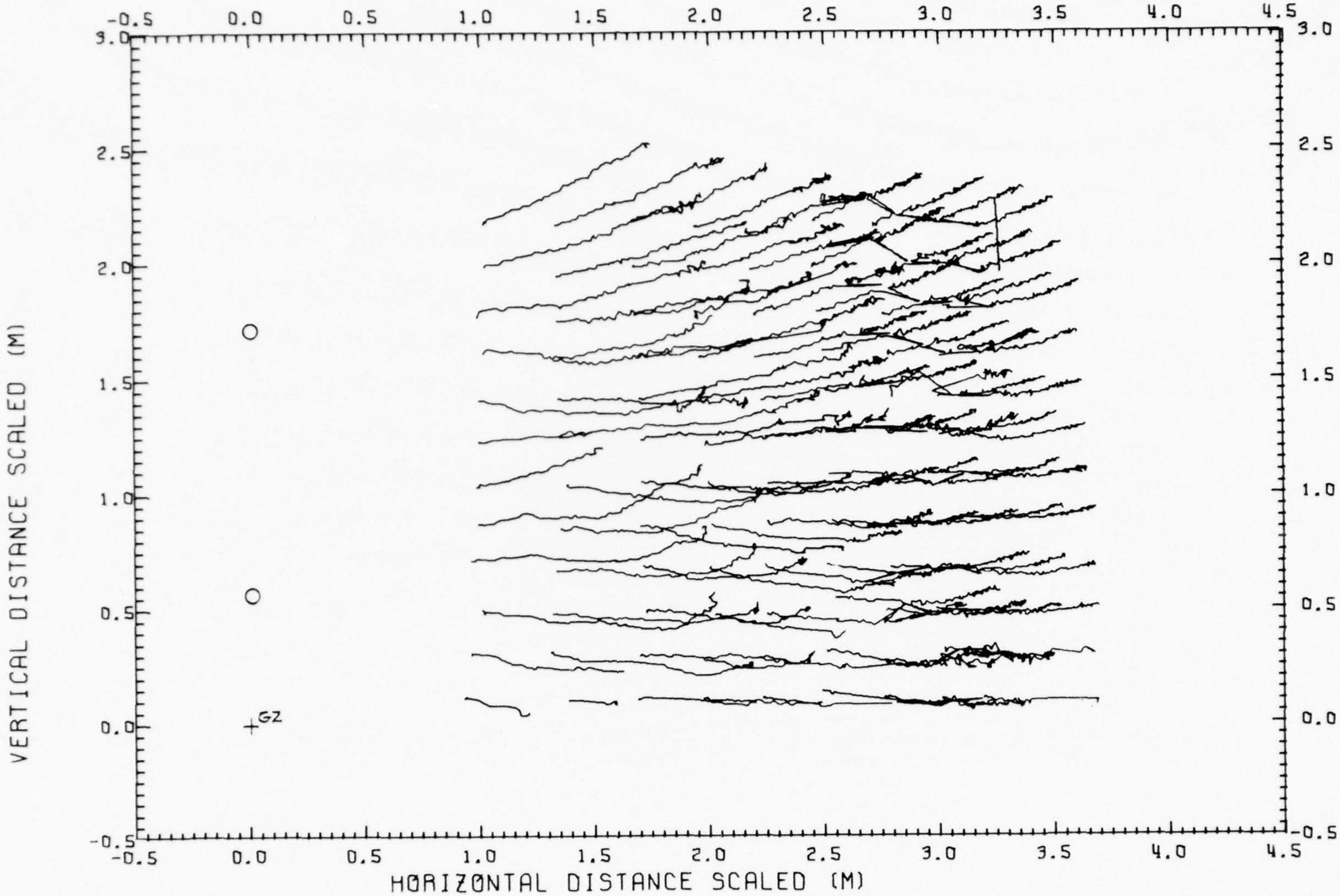

Fig. 5 PARTICLE TRAJECTORIES, DIPOLE WEST/10

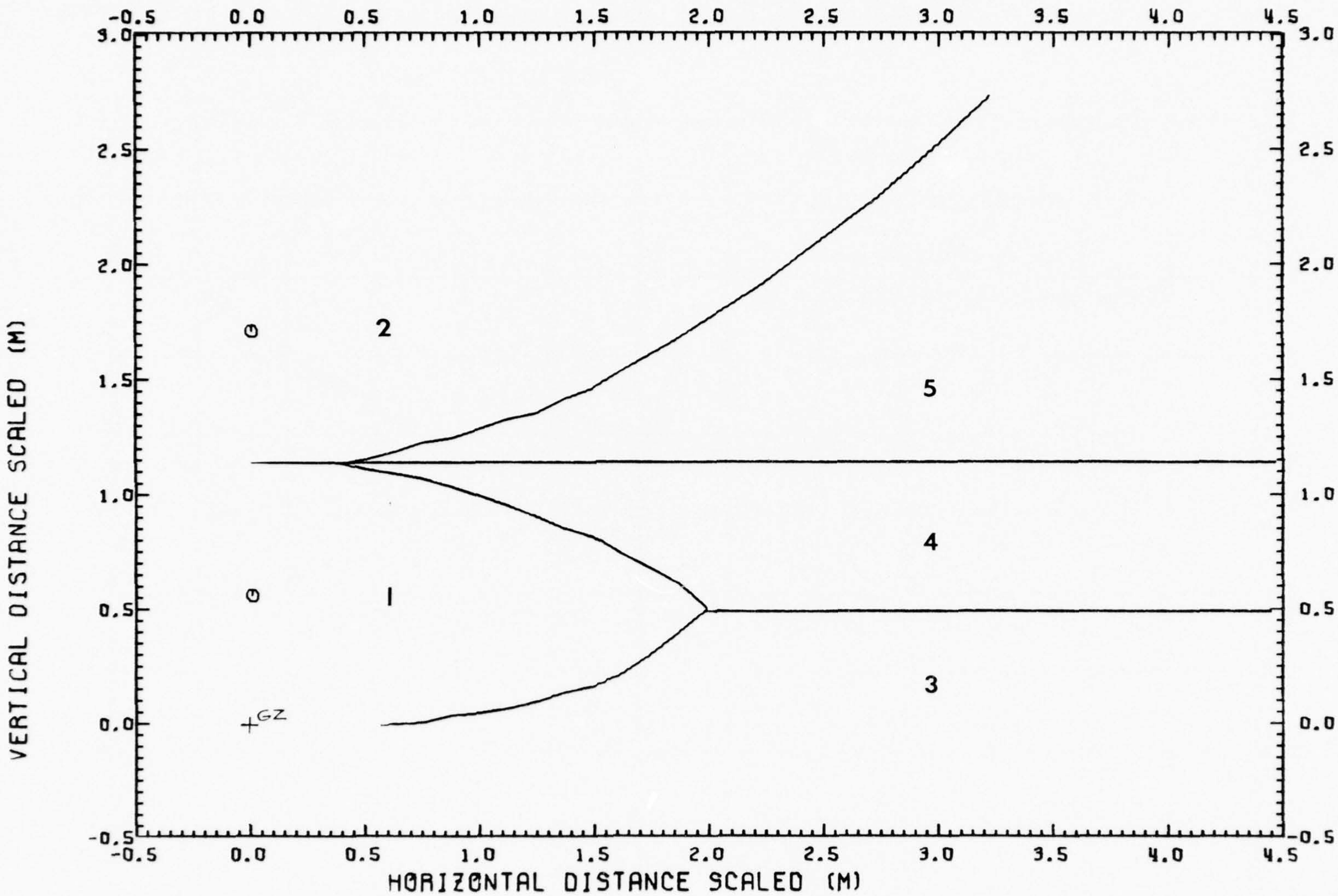

Fig. 6 REGIONS DEFINITION, DIPOLE WEST/10

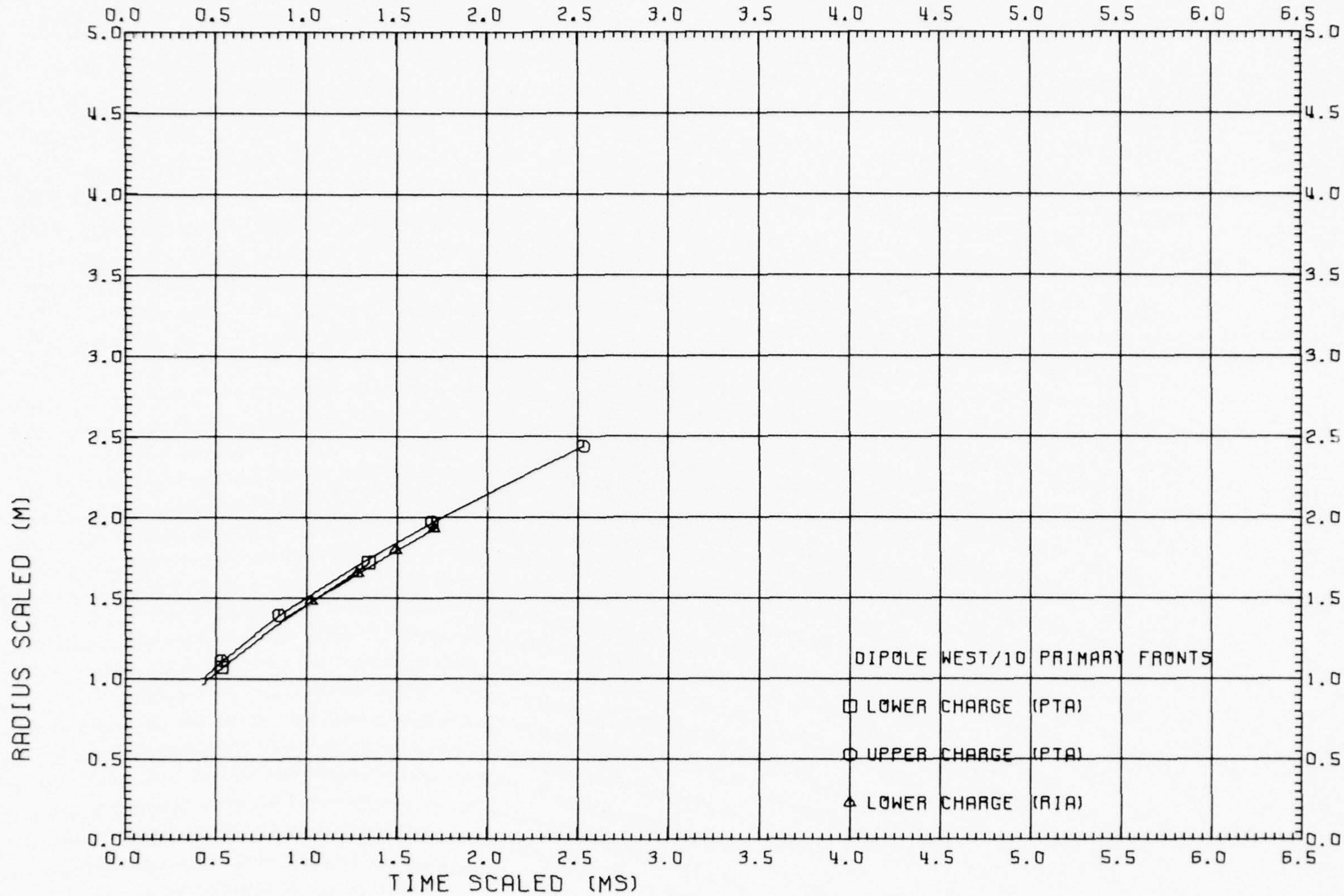

Fig. 7.1 SHOCK TRAJECTORIES, DIPOLE WEST/10

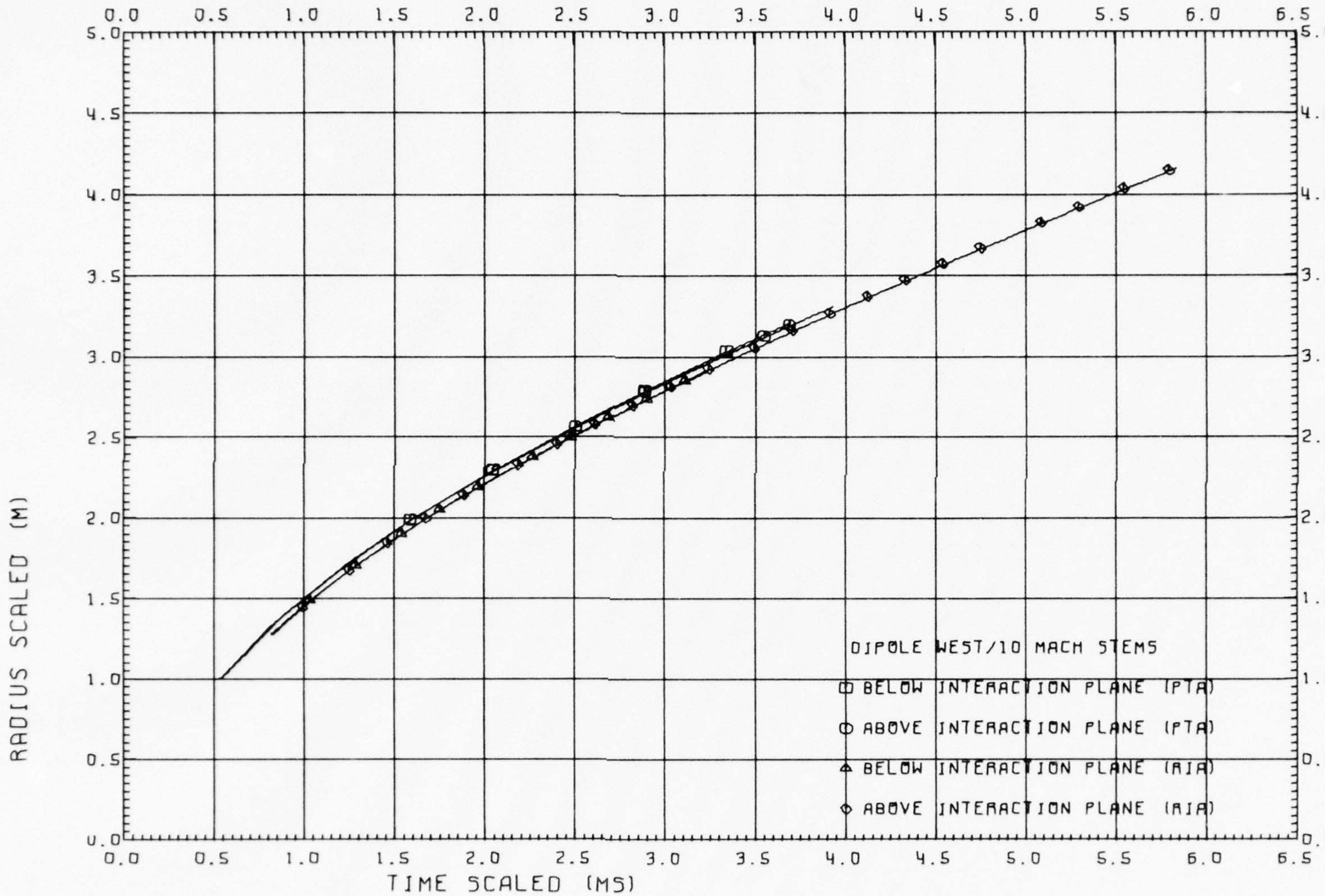

Fig. 7.2 SHOCK TRAJECTORIES, DIPOLE WEST/10

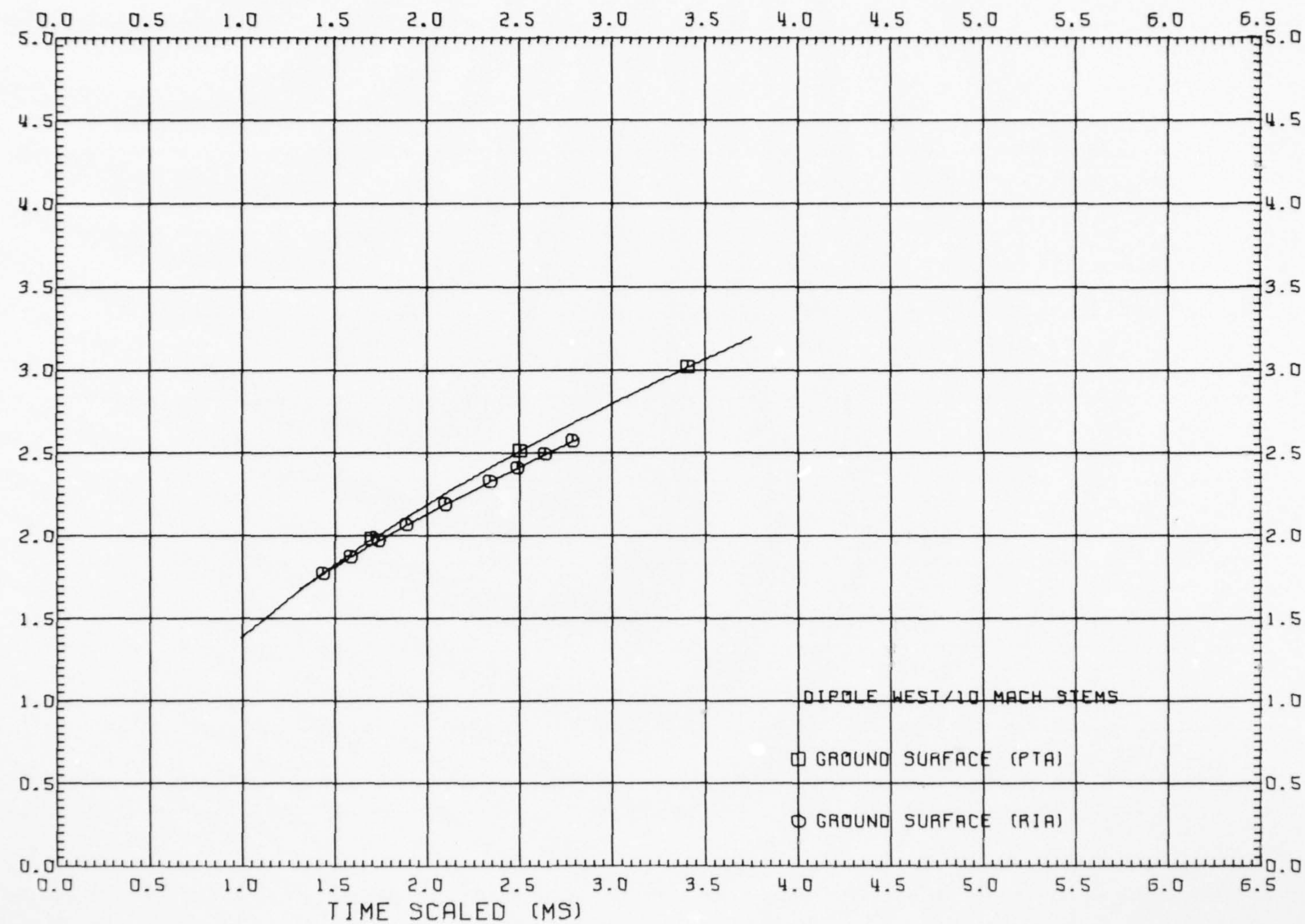

Fig. 7.3 SHOCK TRAJECTORIES, DIPOLE WEST/10

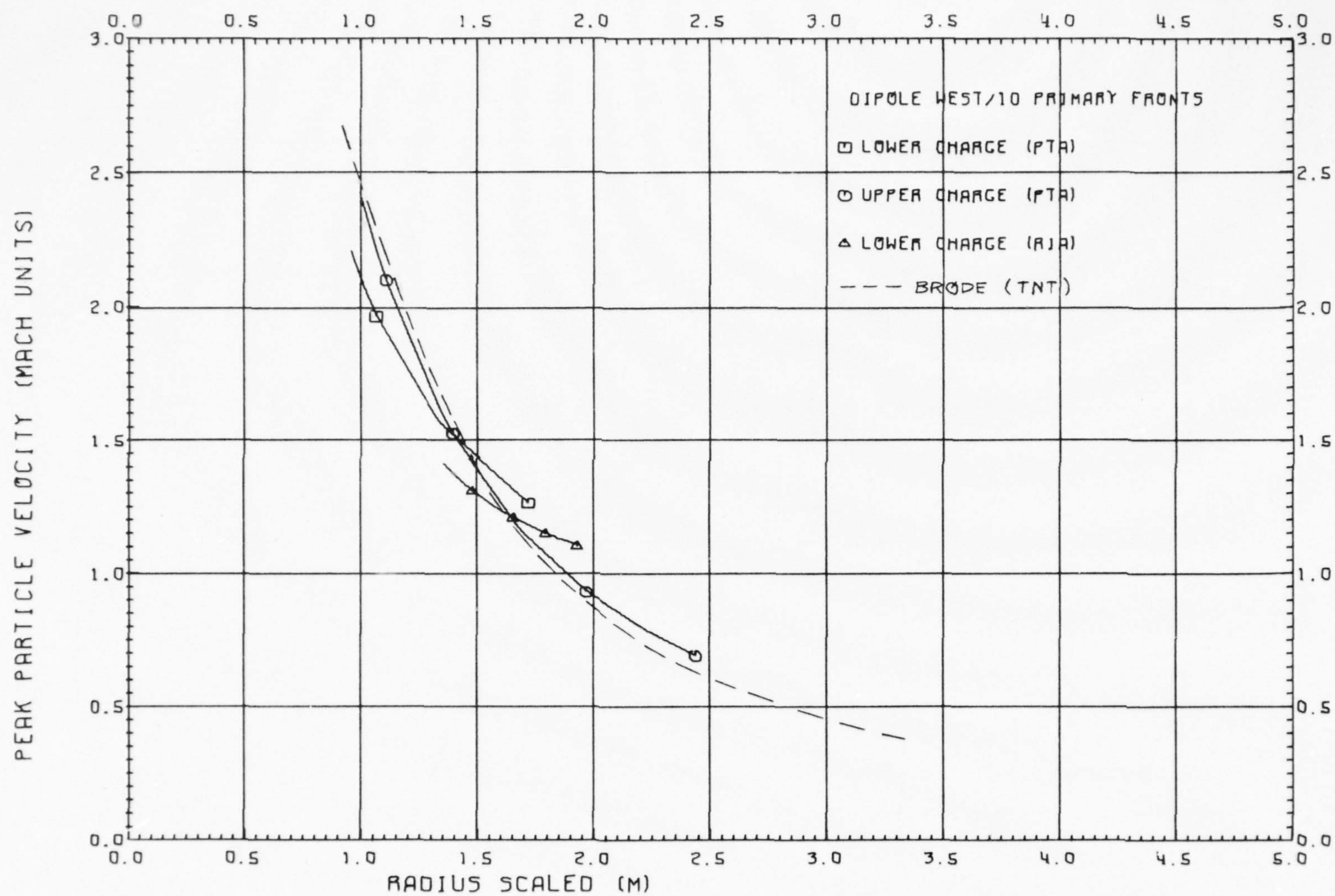

Fig. 8.1 SHOCK STRENGTH, METHOD 1

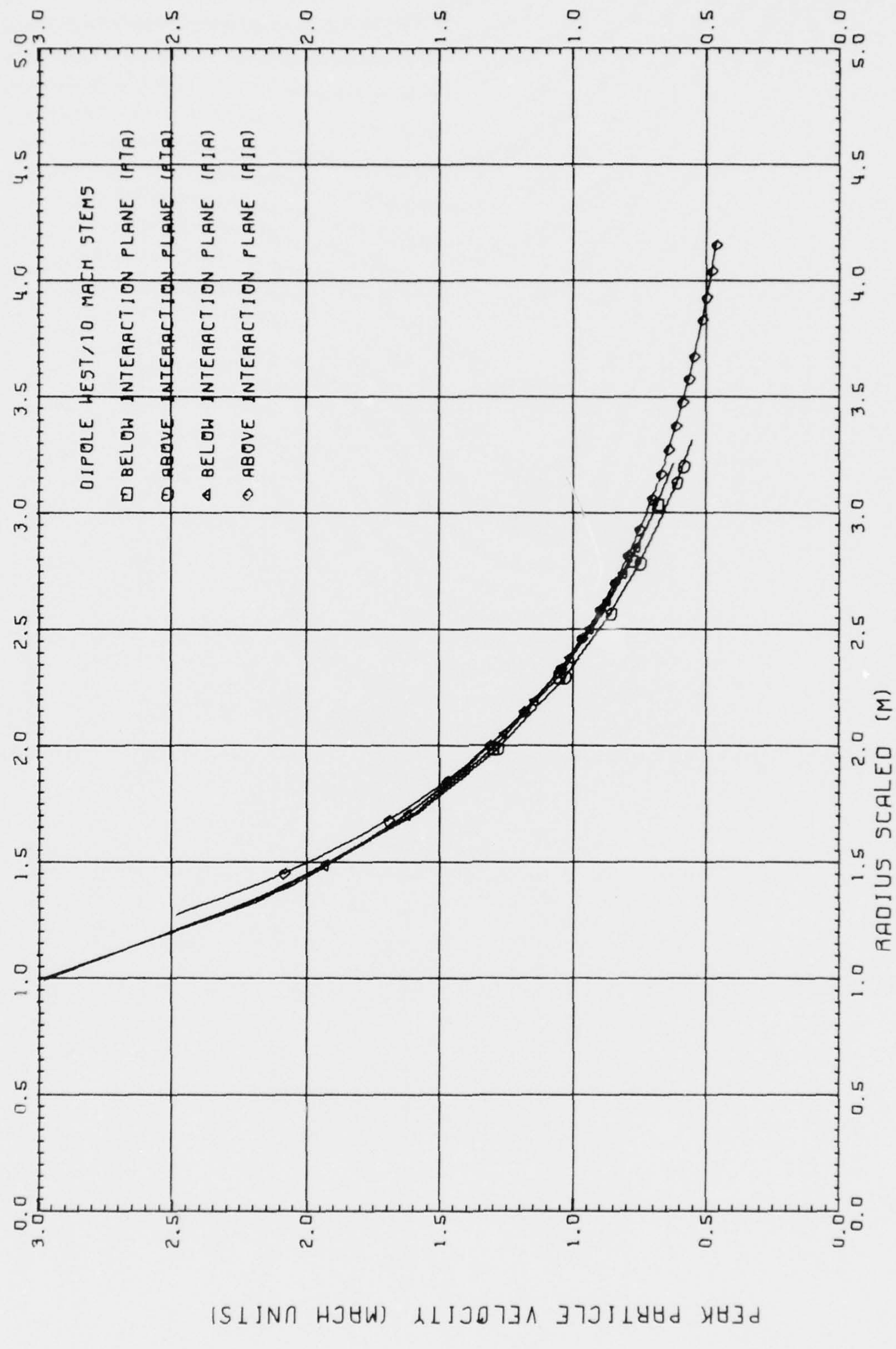

Fig. 8.2 SHOCK STRENGTH, METHOD 1

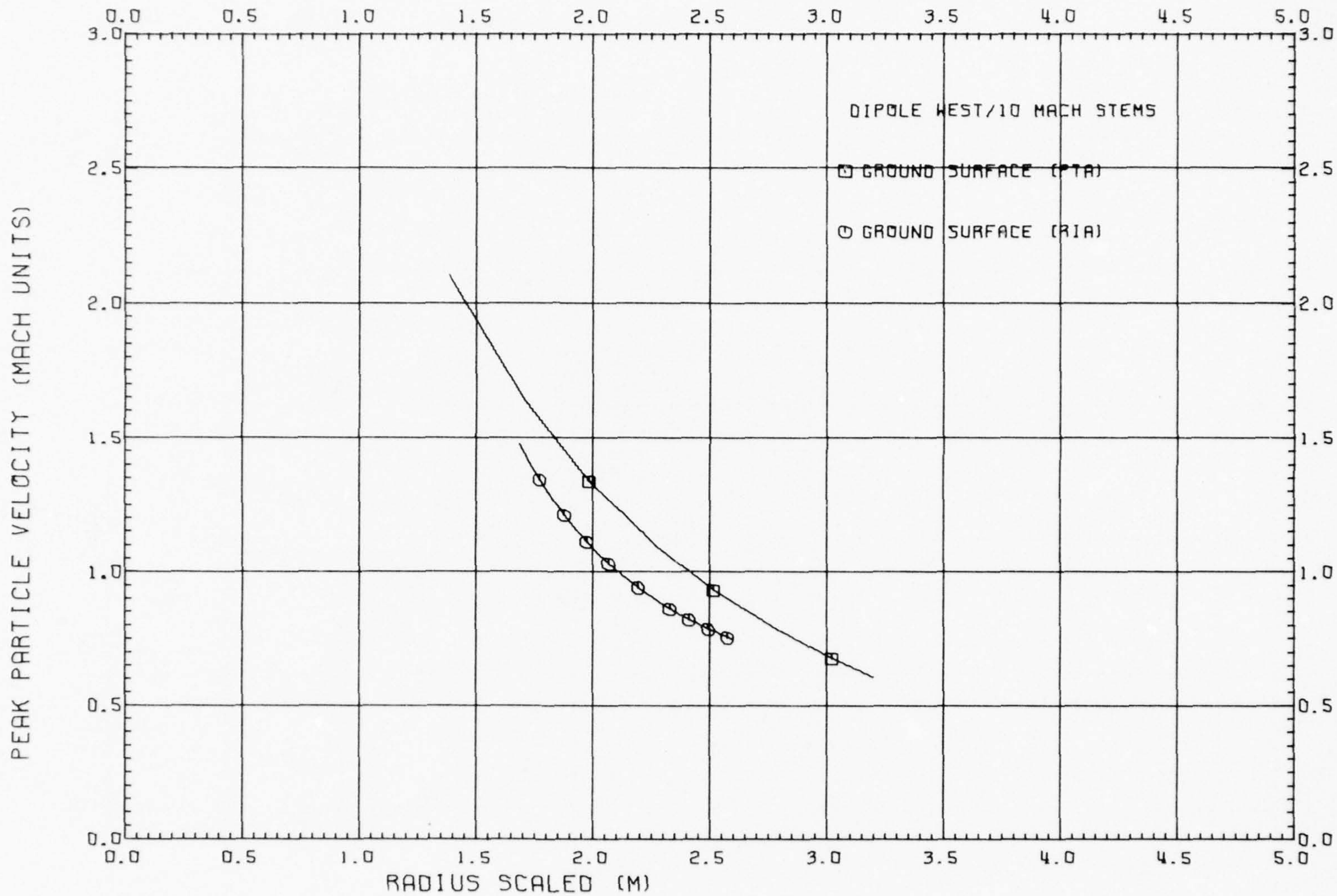

Fig. 8.3 SHOCK STRENGTH, METHOD 1

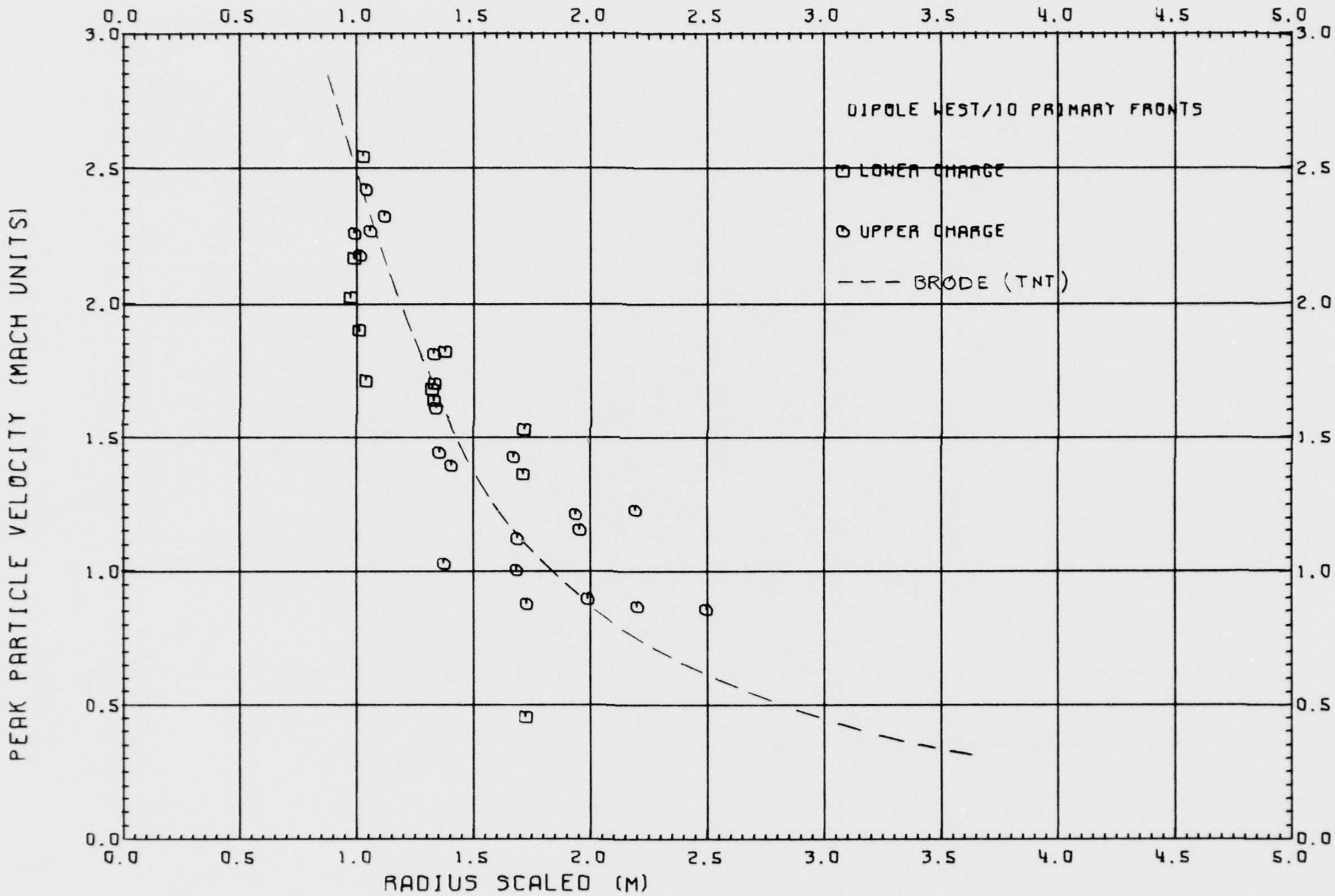

Fig. 9.1 SHOCK STRENGTH, METHOD 2

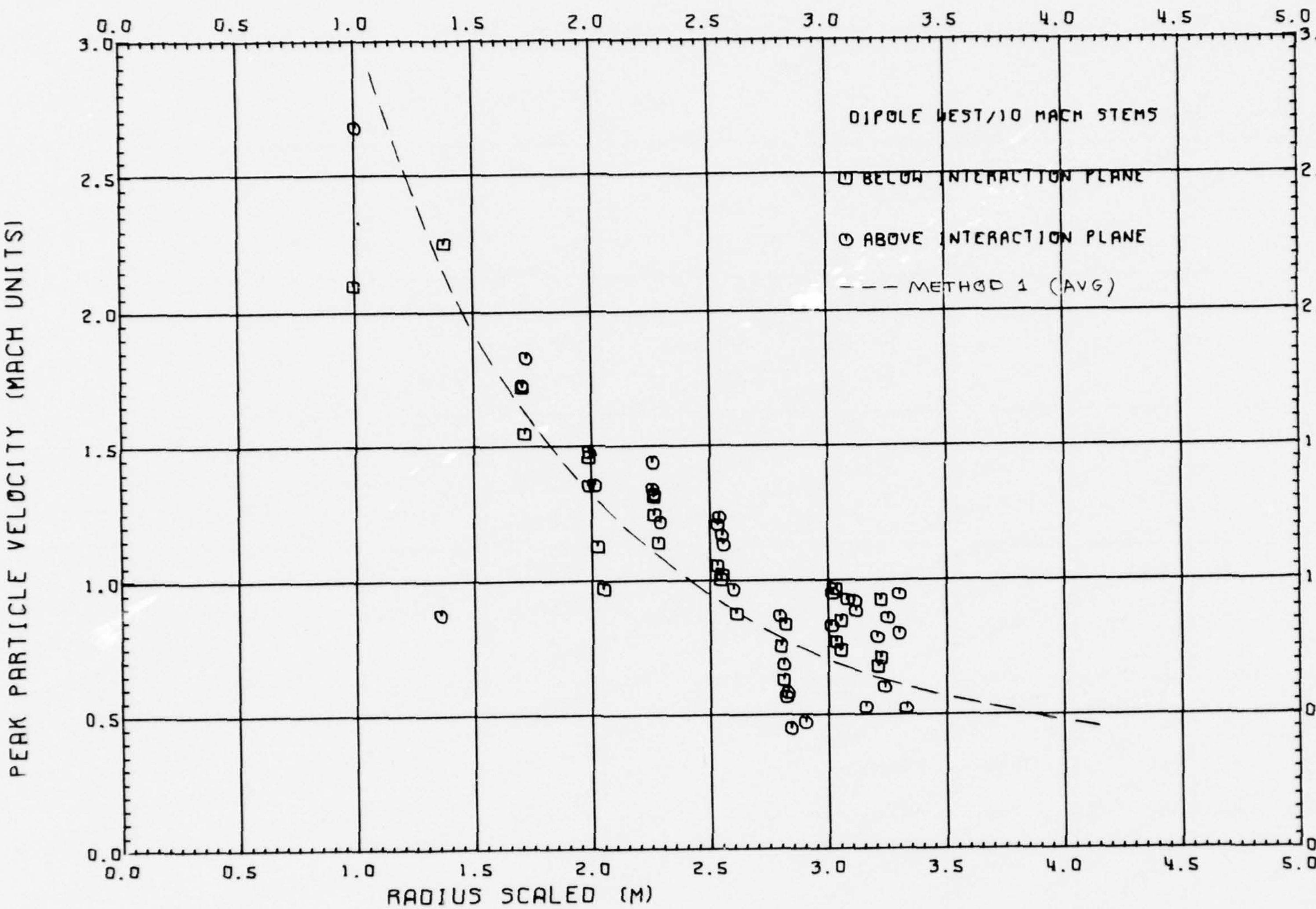

Fig. 9.2 SHOCK STRENGTH, METHOD 2

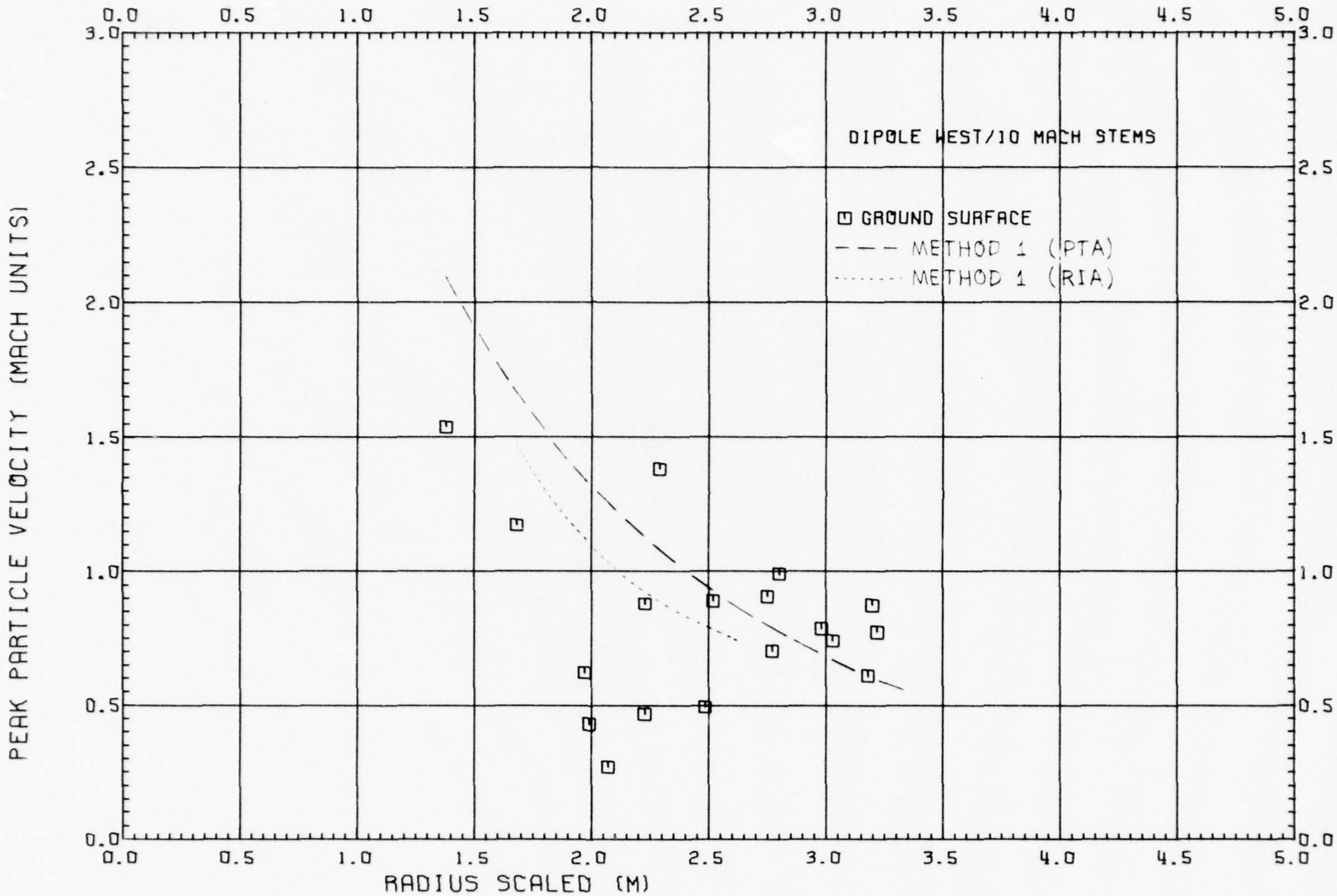

Fig. 9.3 SHOCK STRENGTH, METHOD 2

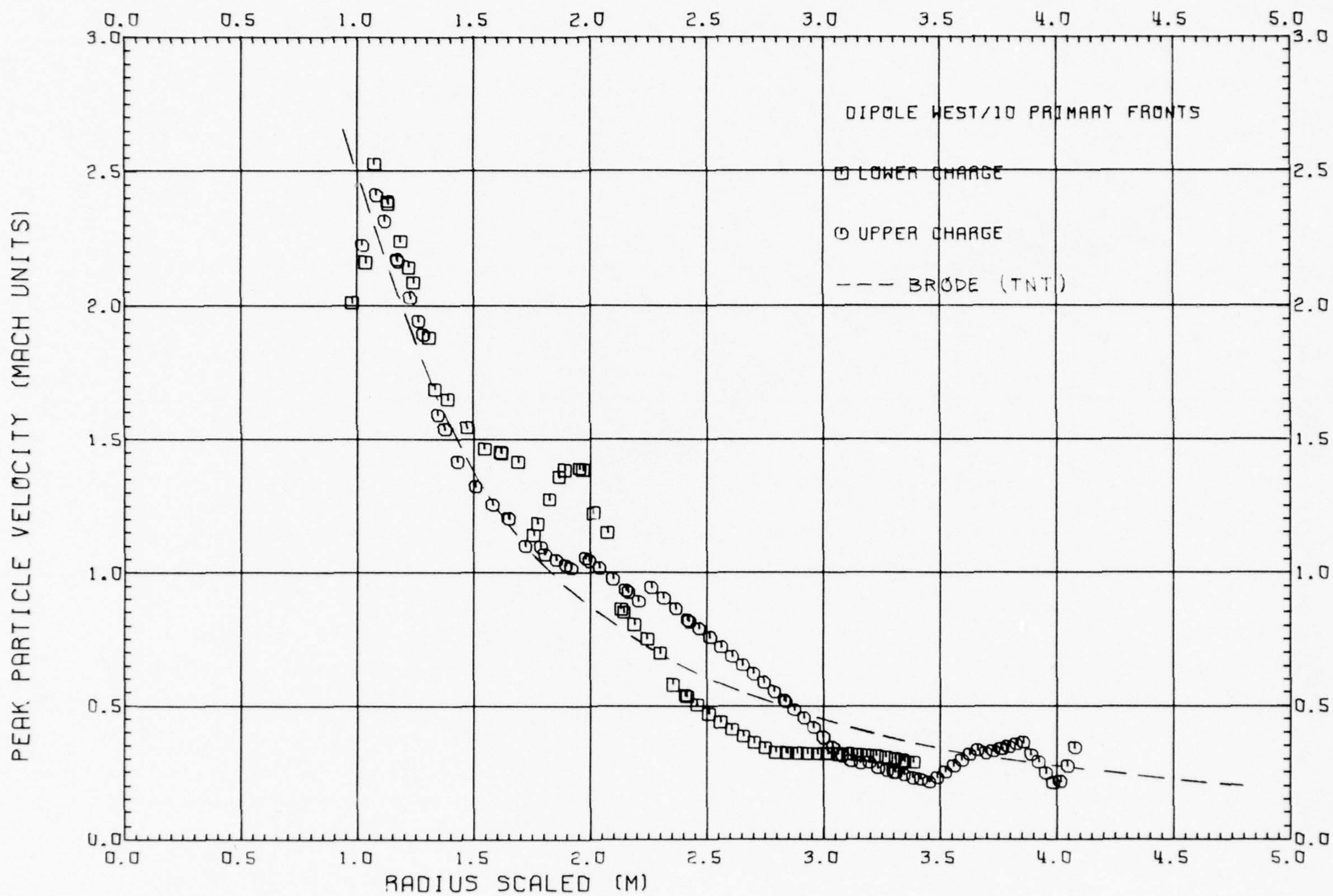

Fig. 10.1 SHOCK STRENGTH, METHOD 3

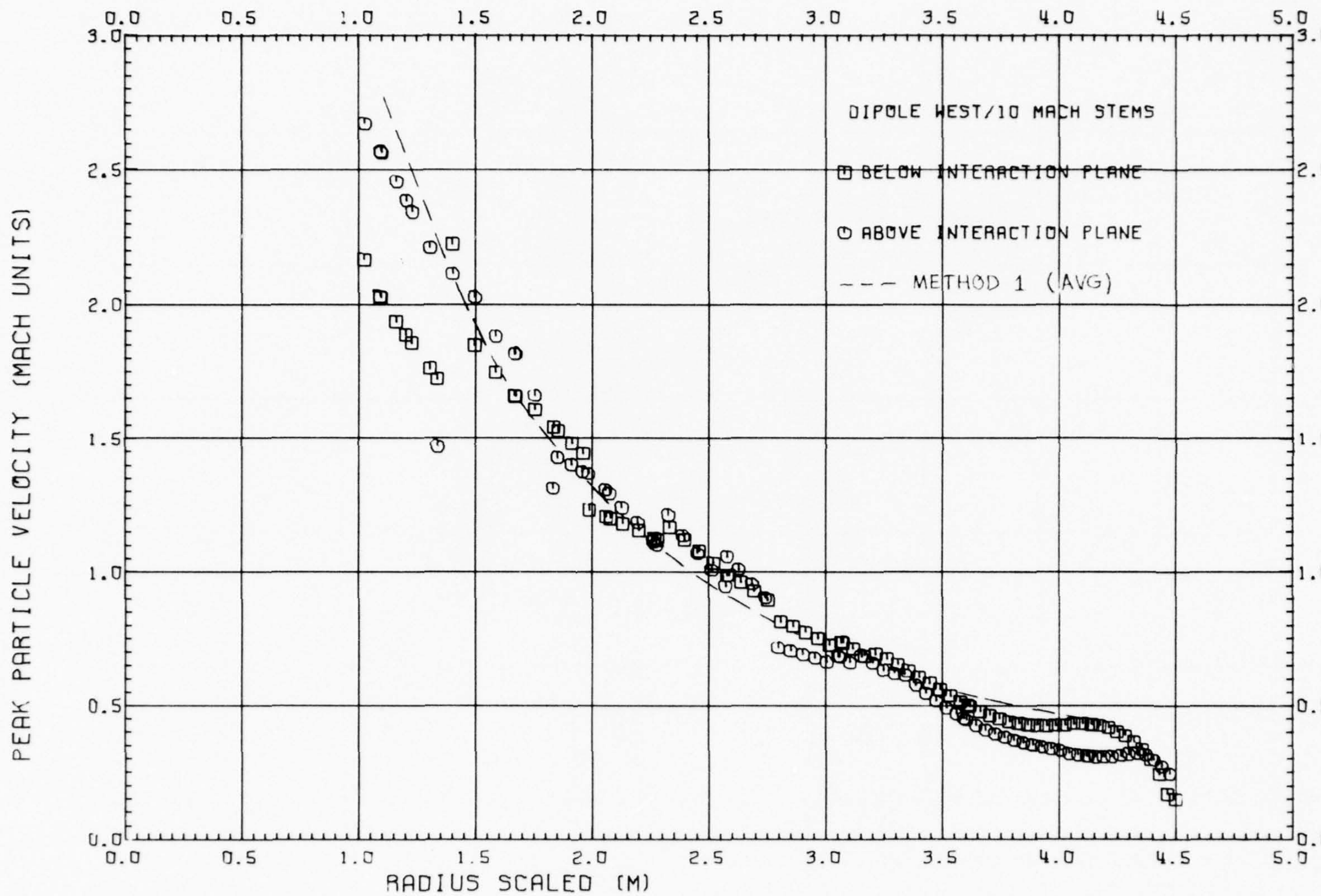

Fig. 10.2 SHOCK STRENGTH, METHOD 3

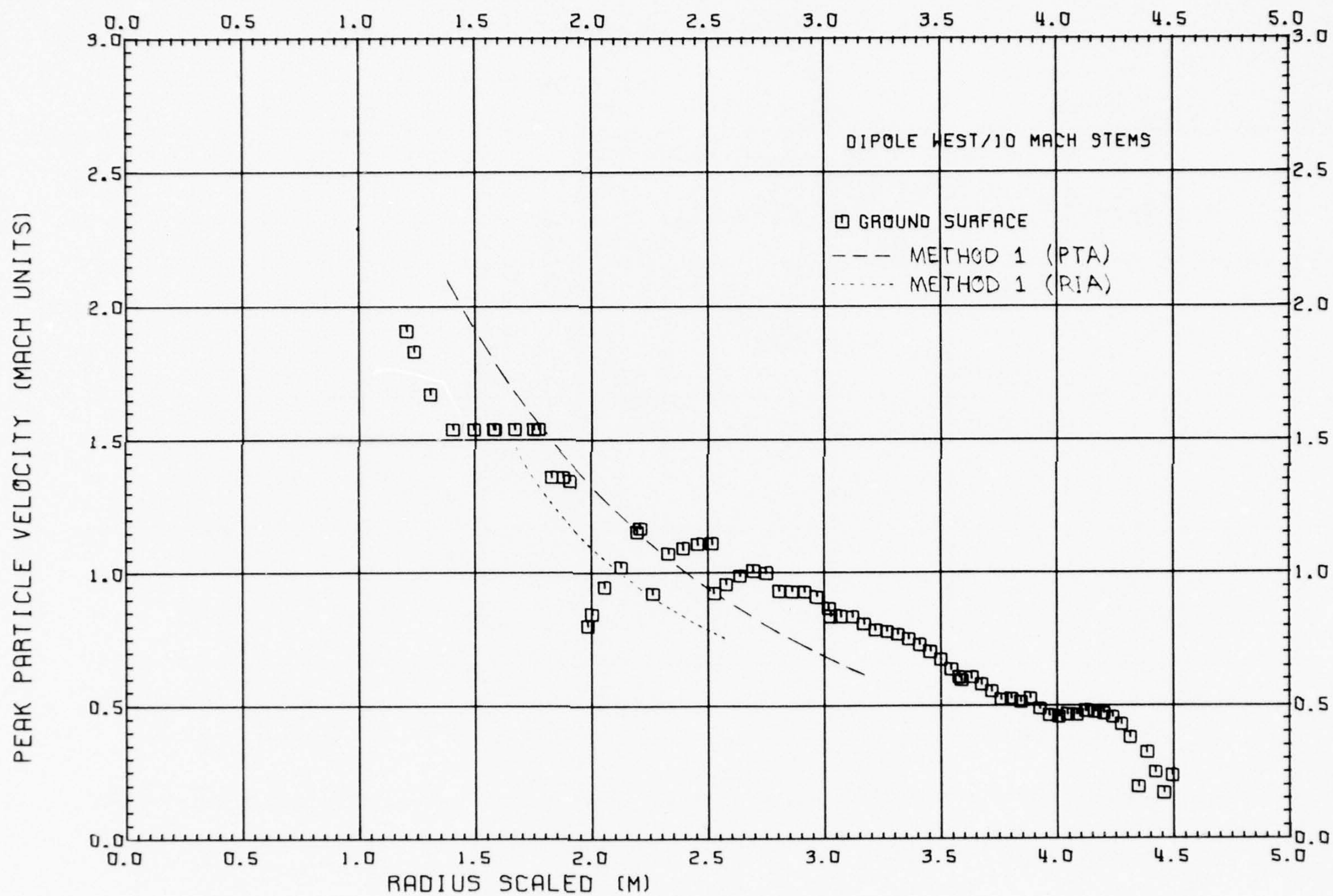

Fig. 10.3 SHOCK STRENGTH, METHOD 3

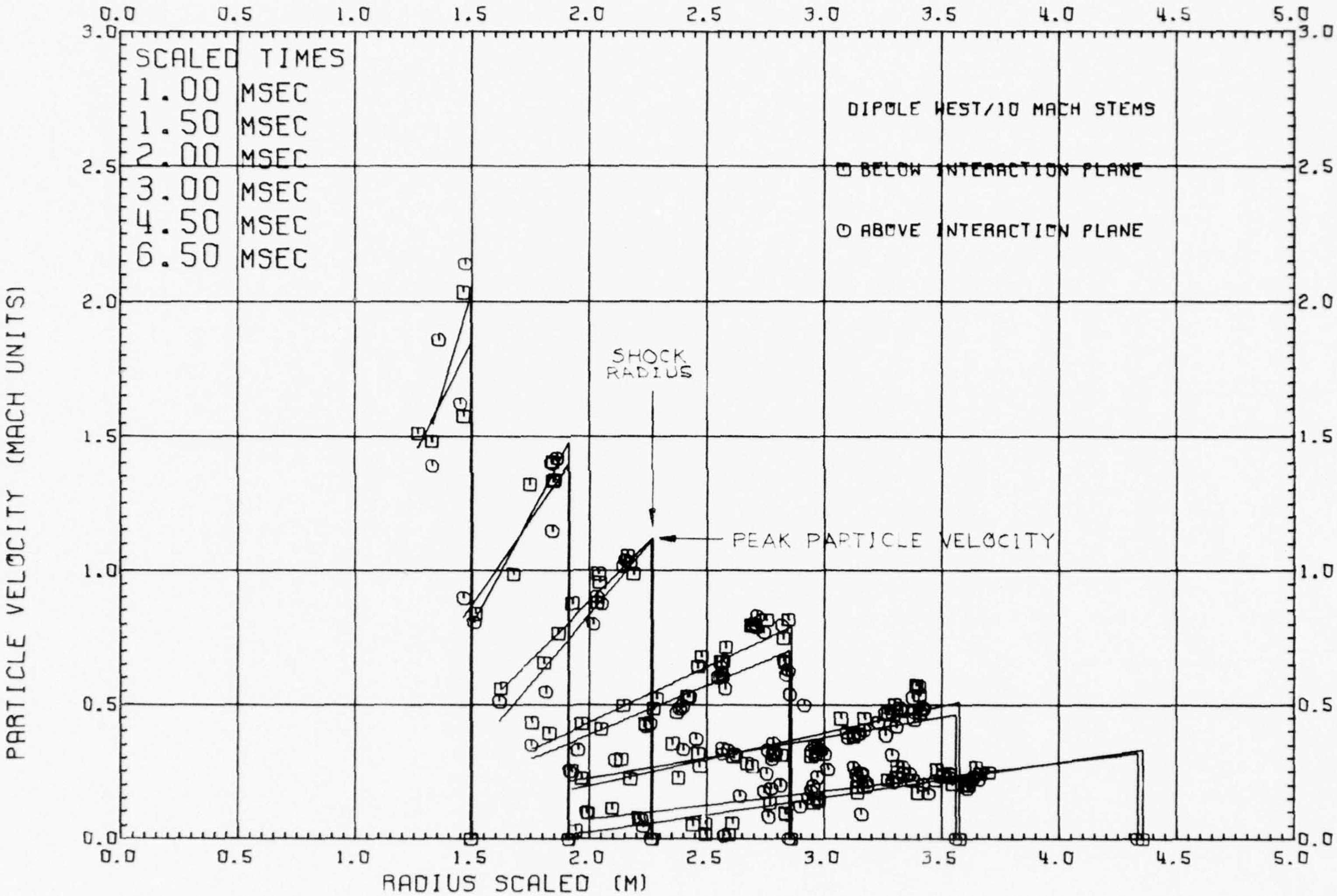

Fig. 11.1 PARTICLE VELOCITY, REGIONS 4 AND 5

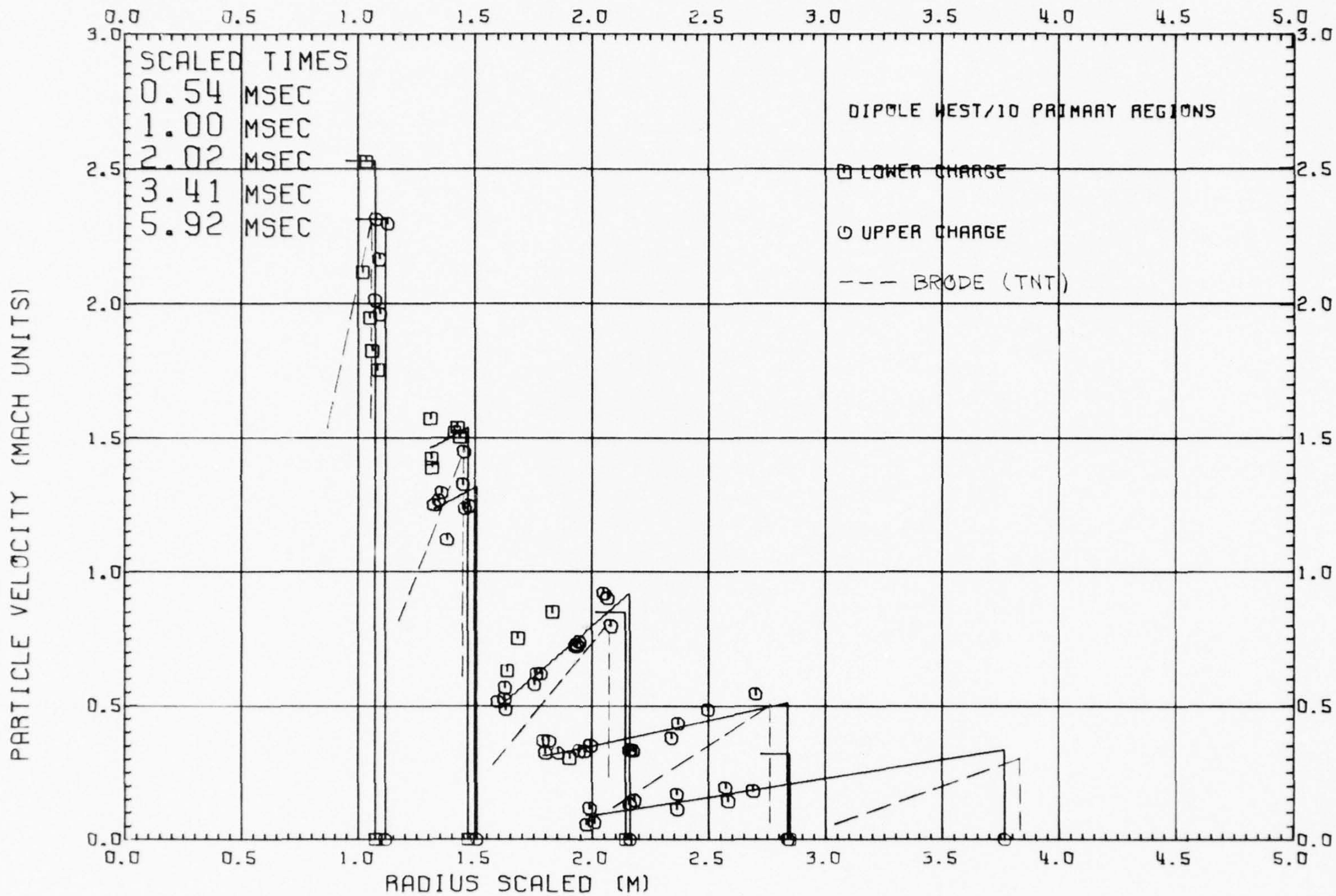

Fig. 11.2 PARTICLE VELOCITY, REGIONS 1 AND 2

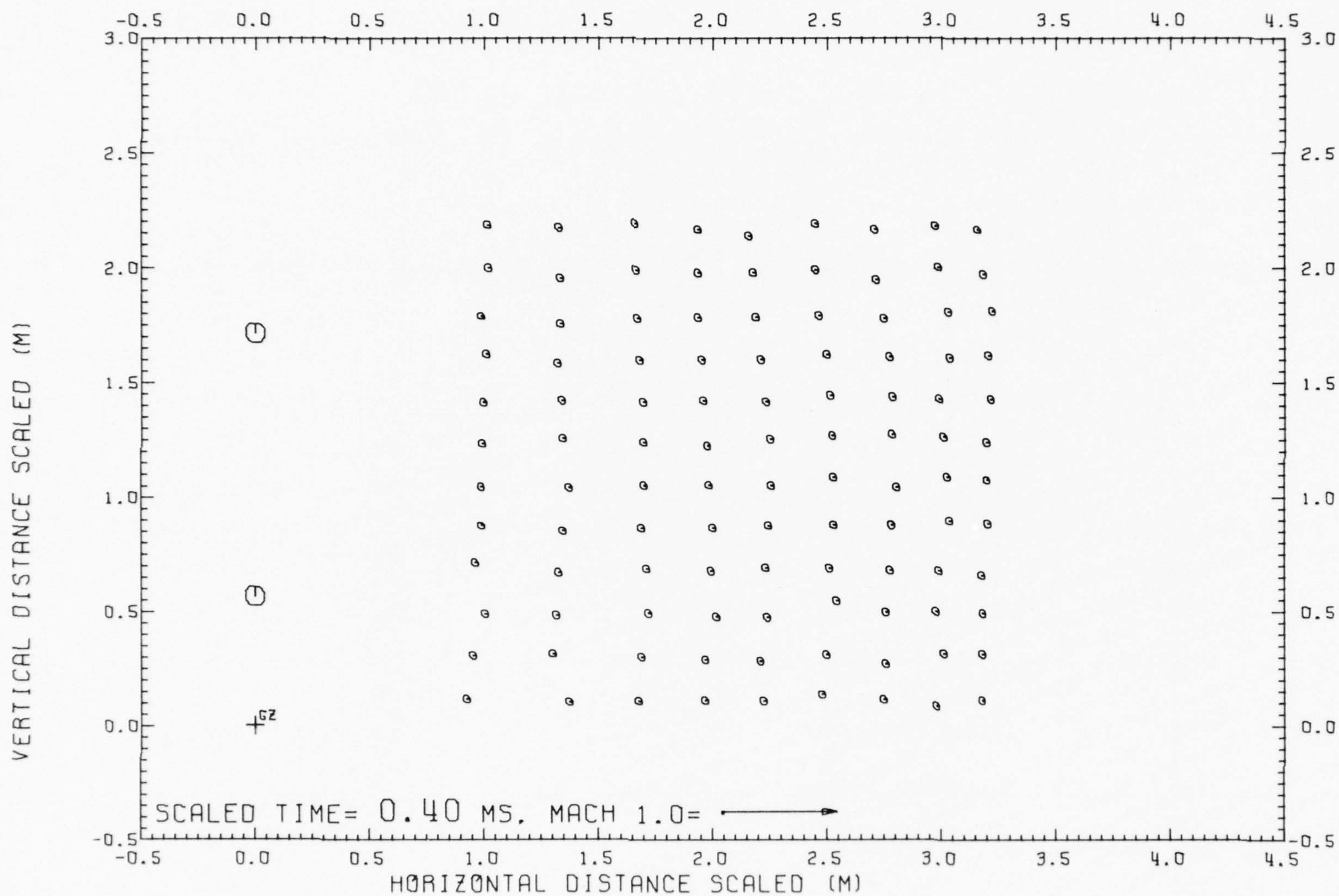

Fig. 12.1 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

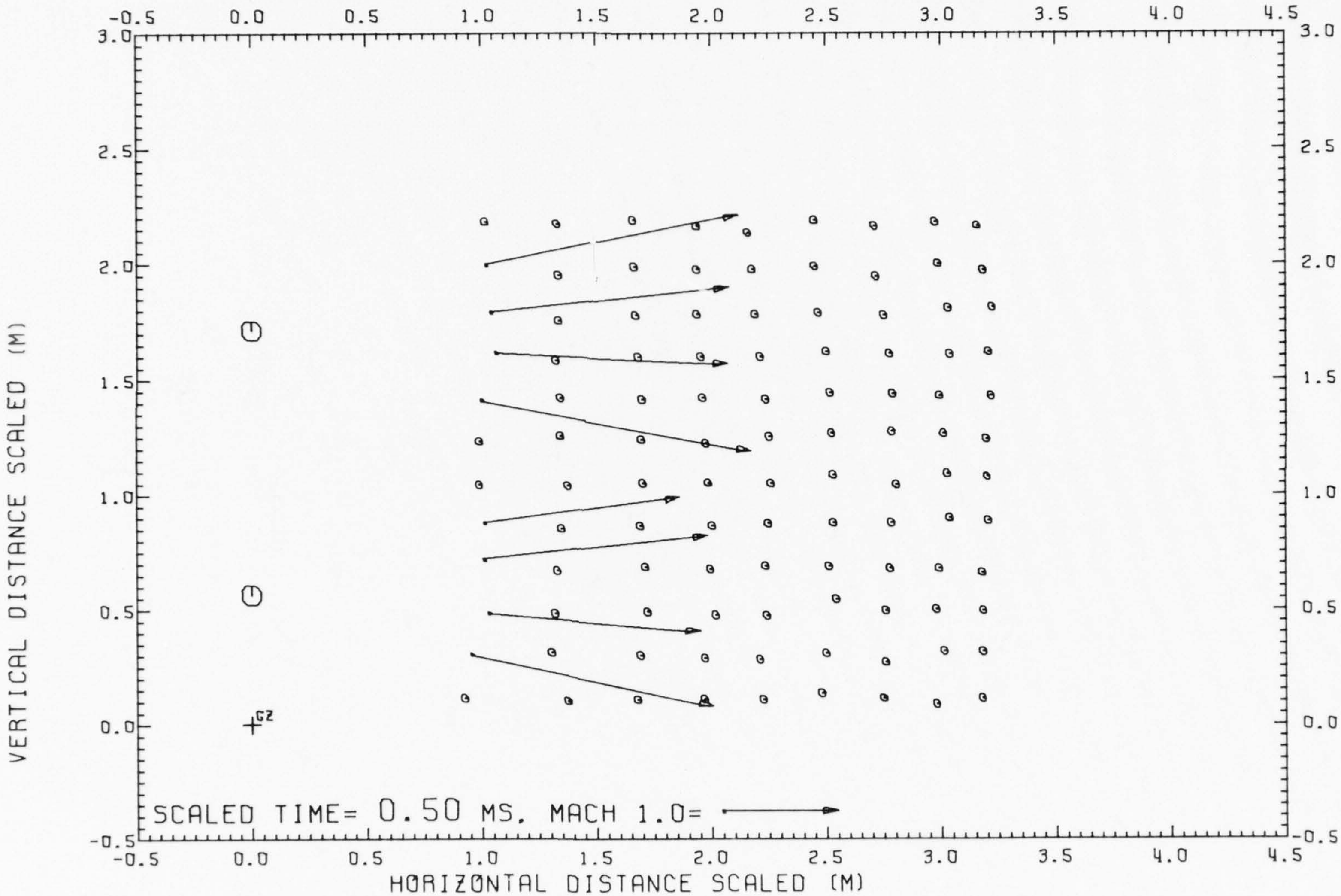

Fig. 12.2 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

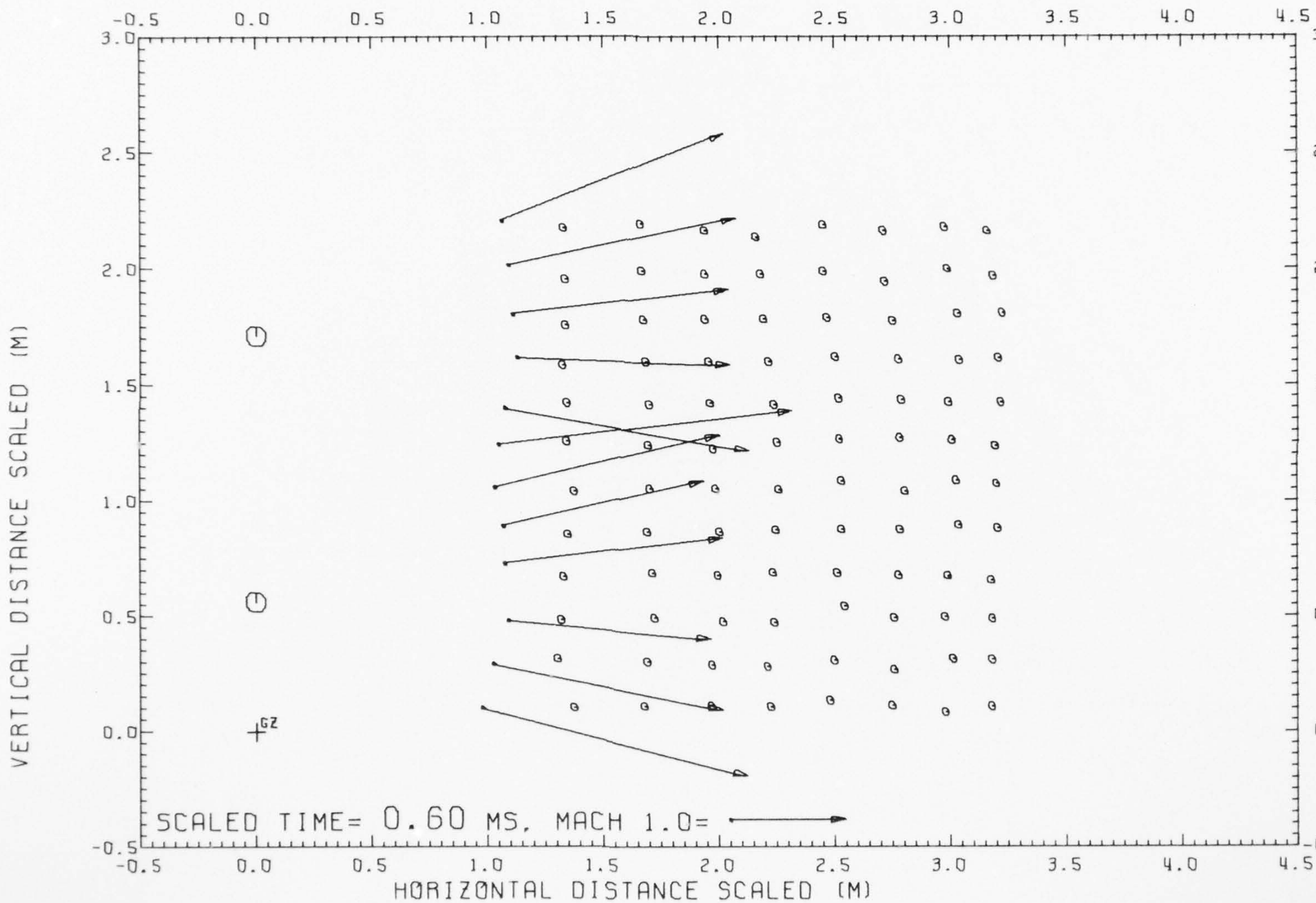

Fig. 12.3 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

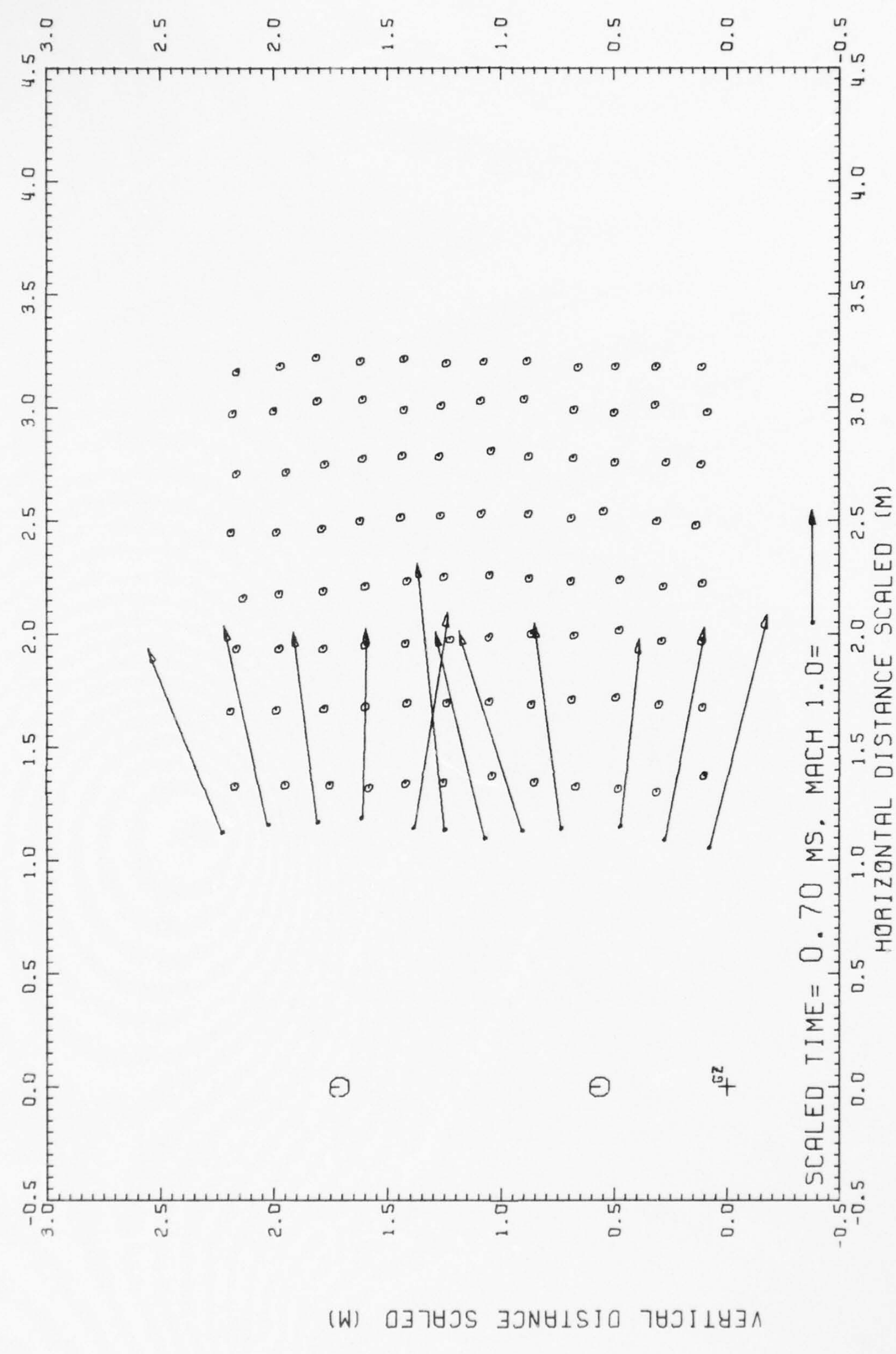

Fig. 12.4 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

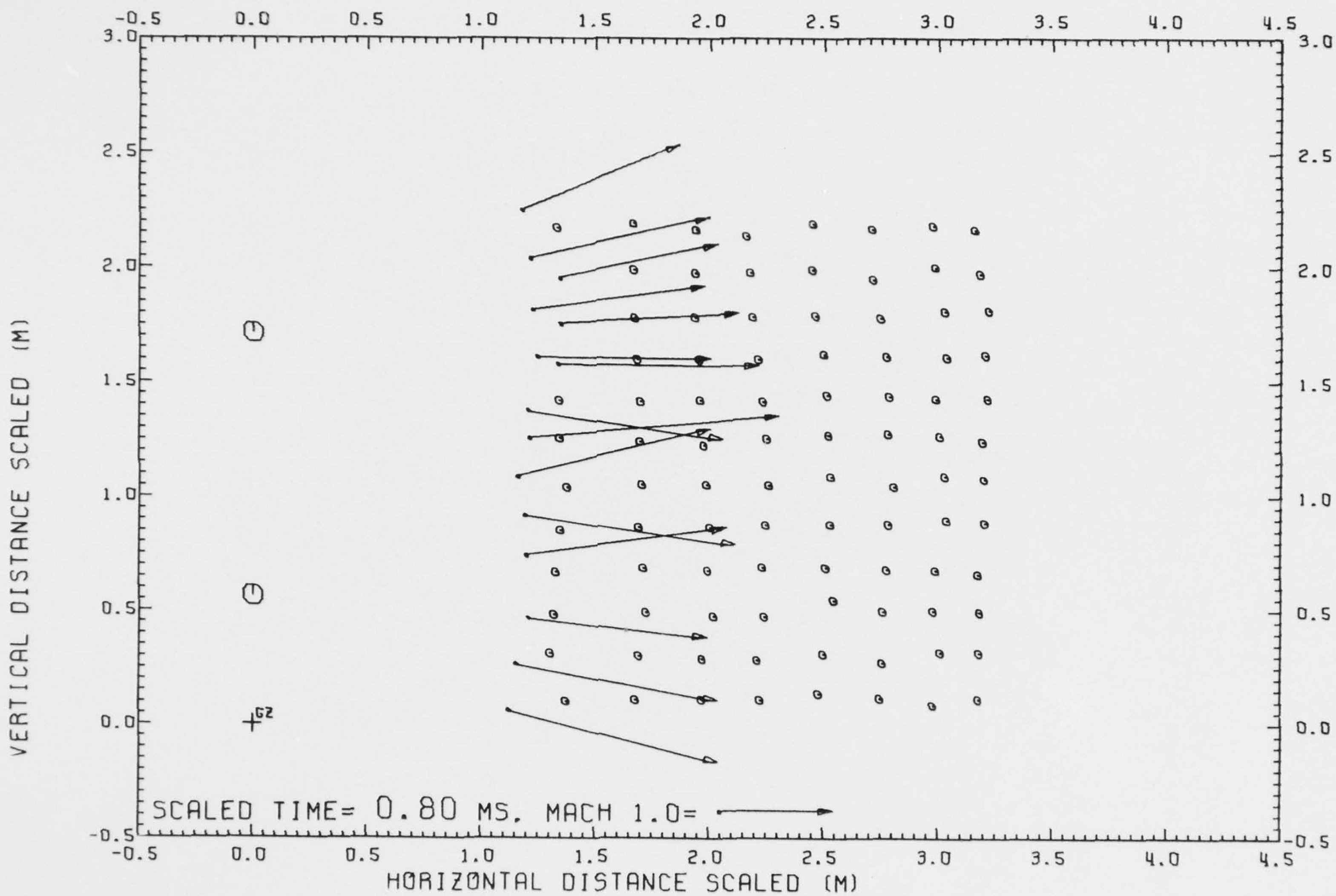

Fig. 12.5 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

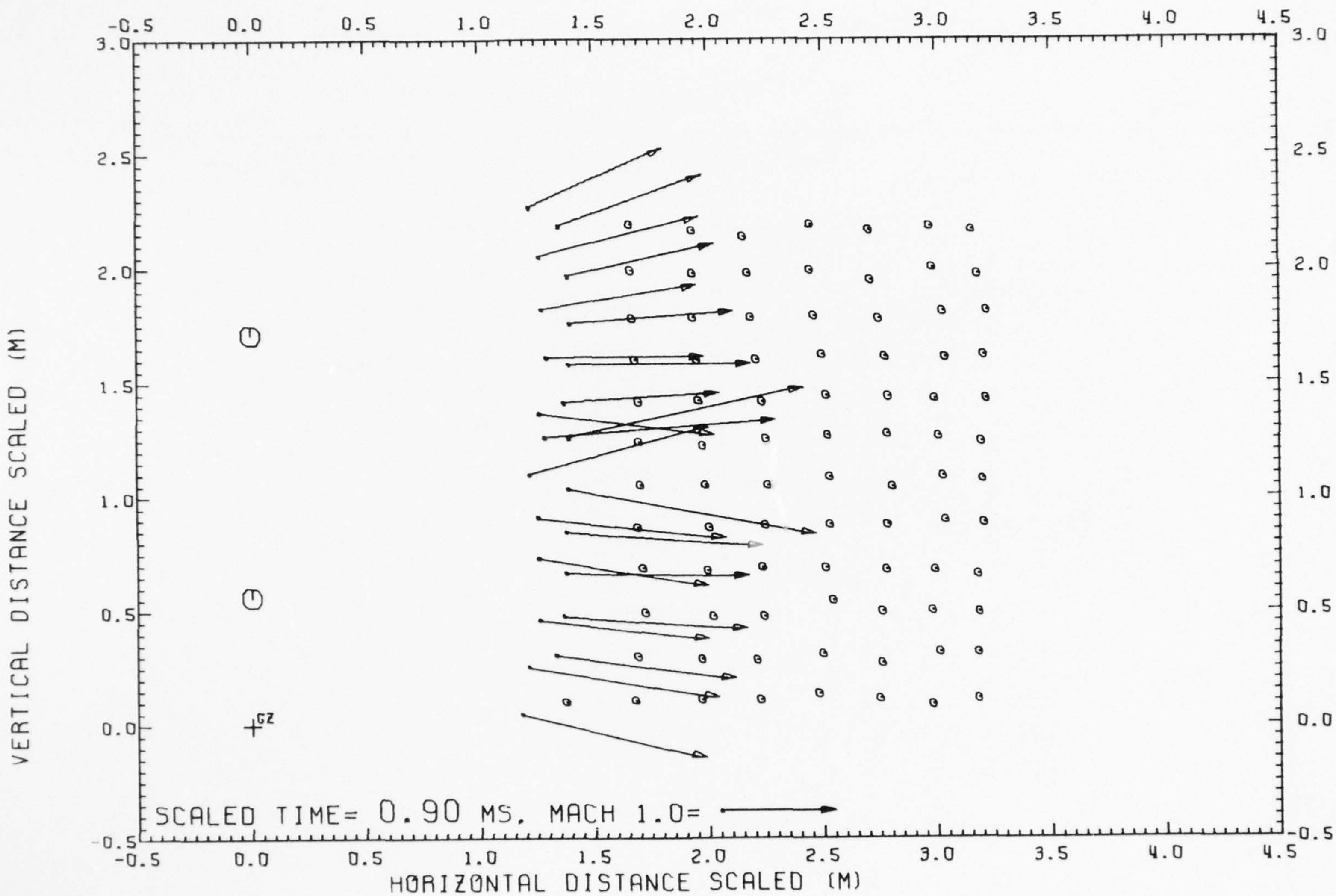

Fig. 12.6 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

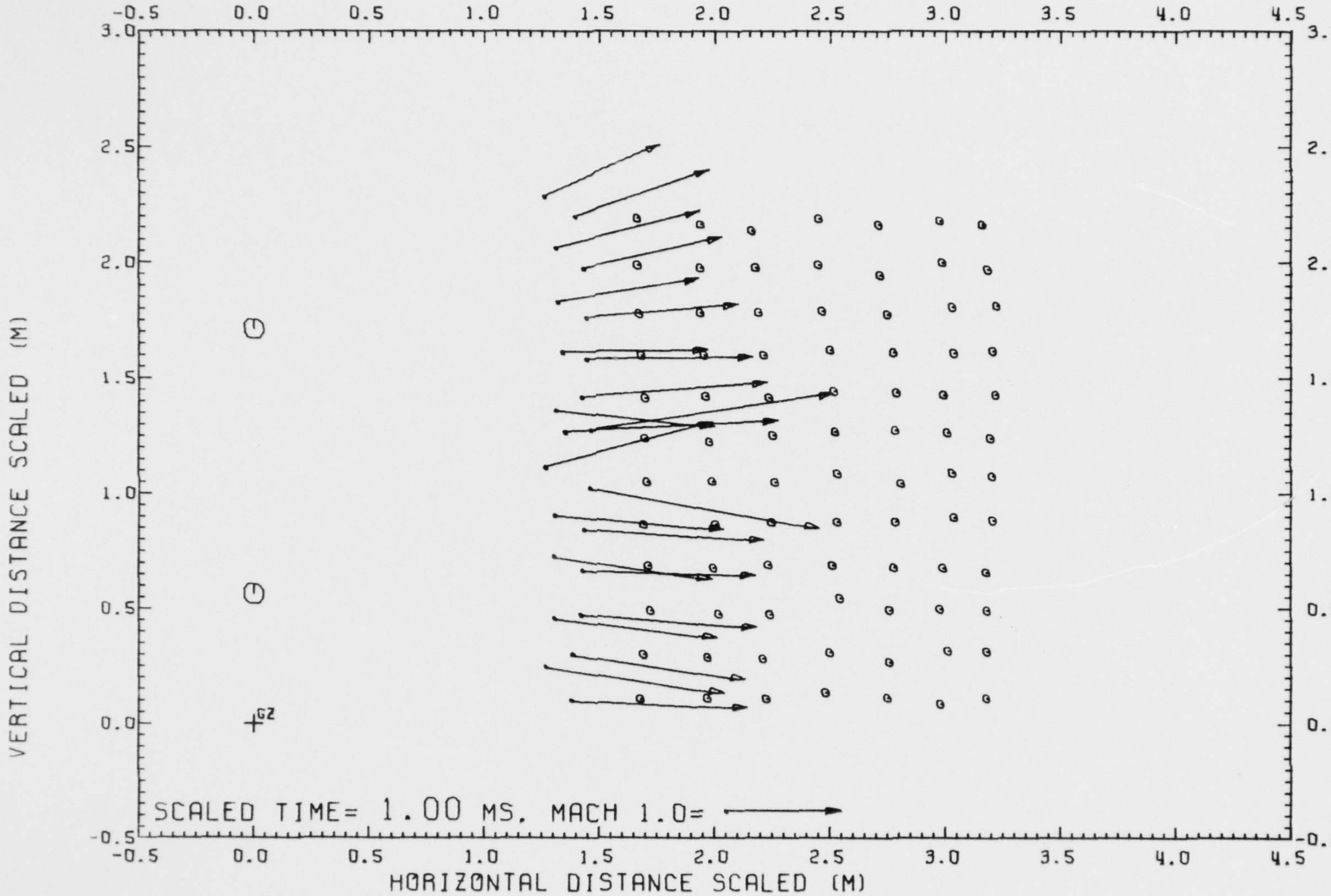

Fig. 12.7 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

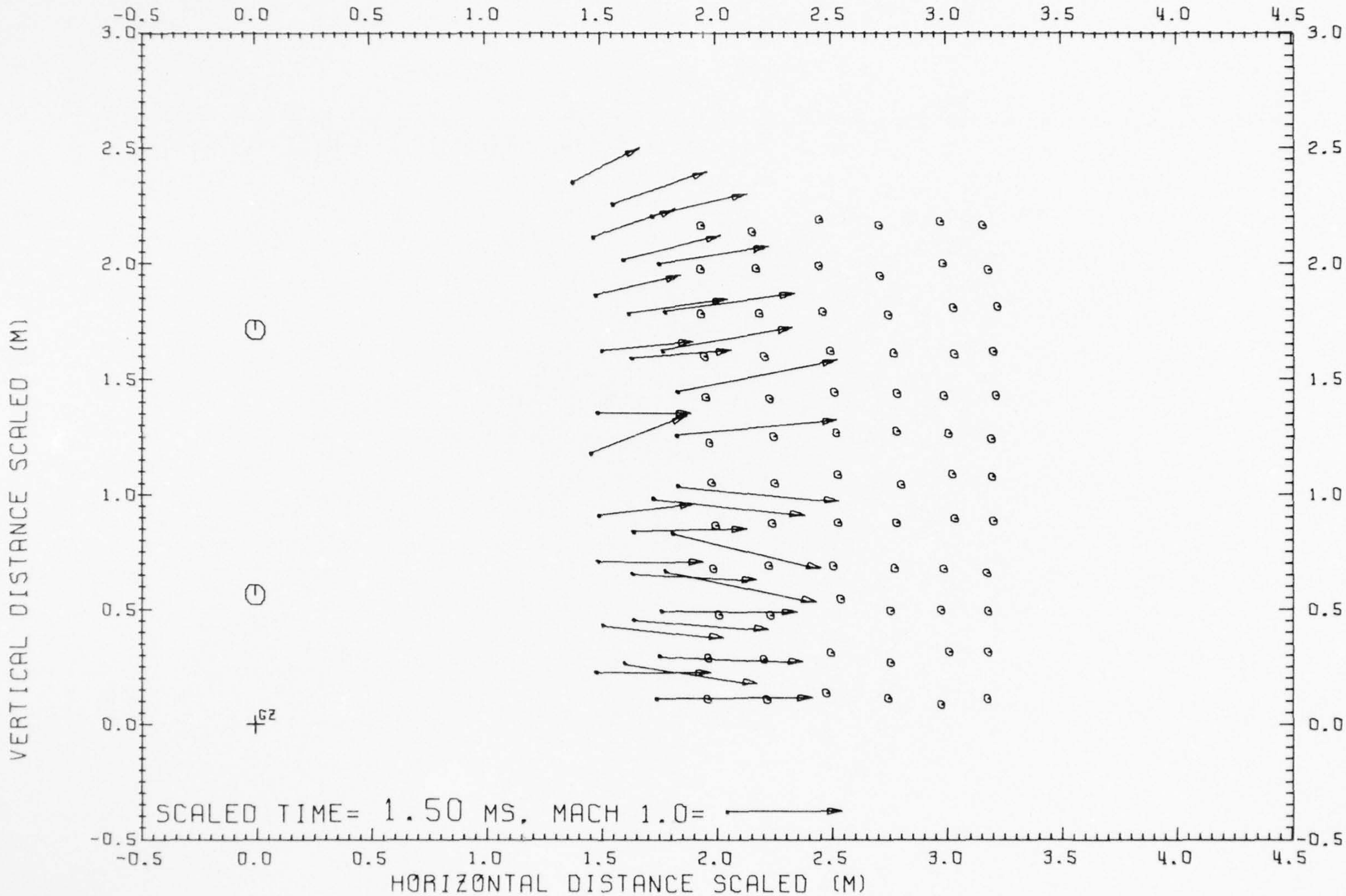

Fig. 12.8 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

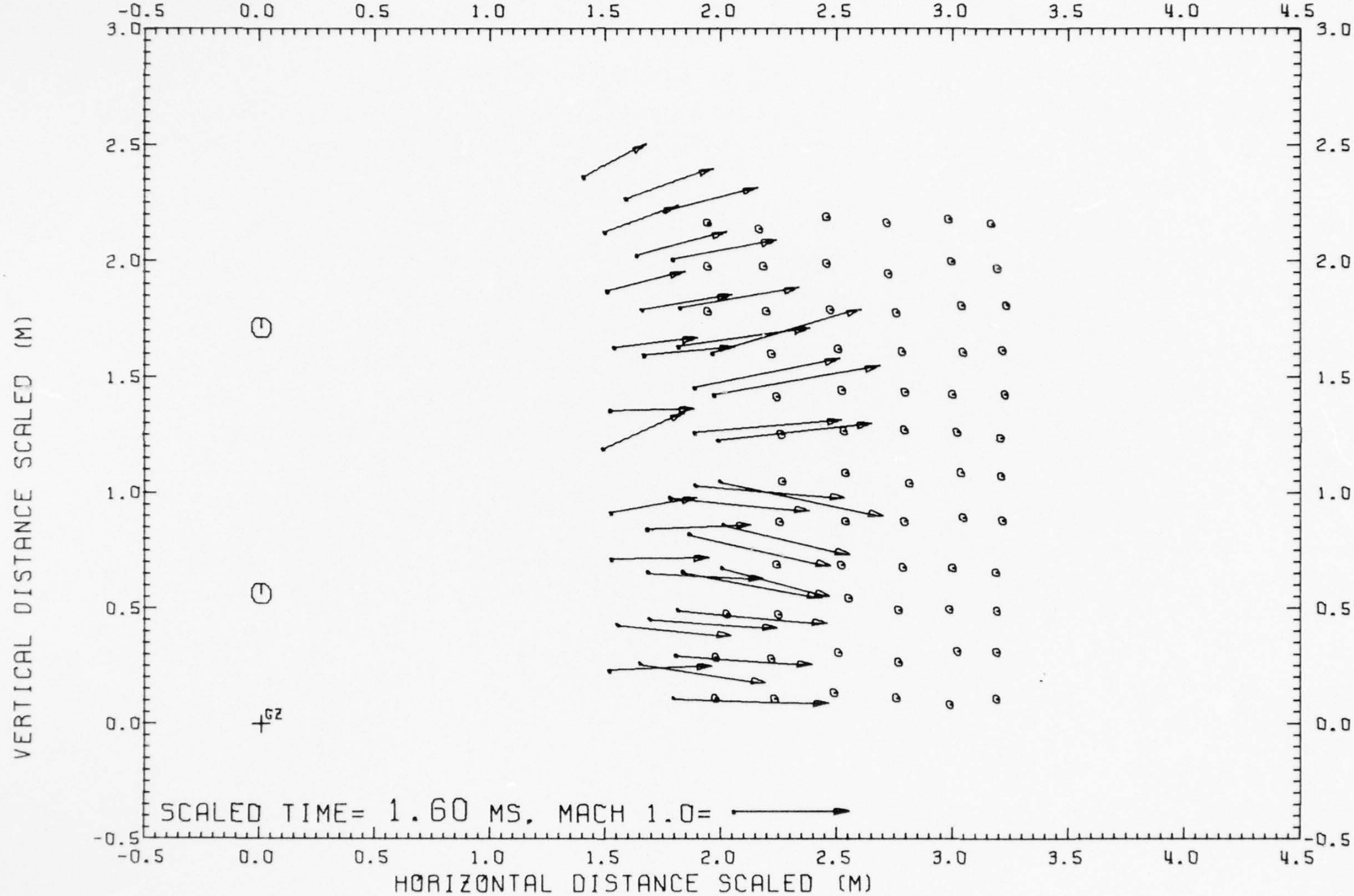

Fig. 12.9 PARTICLE VELOCITY FIELD. DIPOLE WEST/10

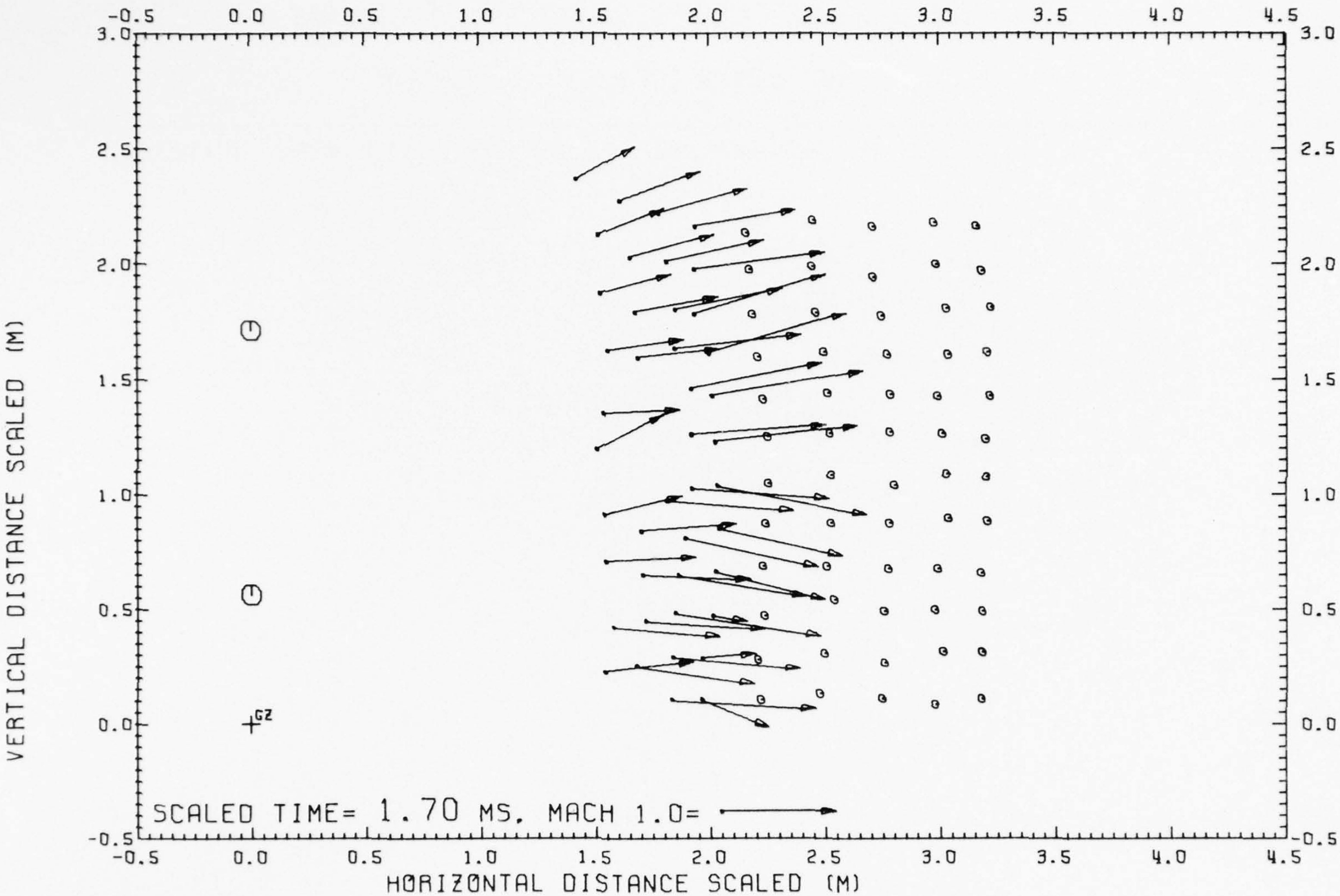

Fig. 12.10 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

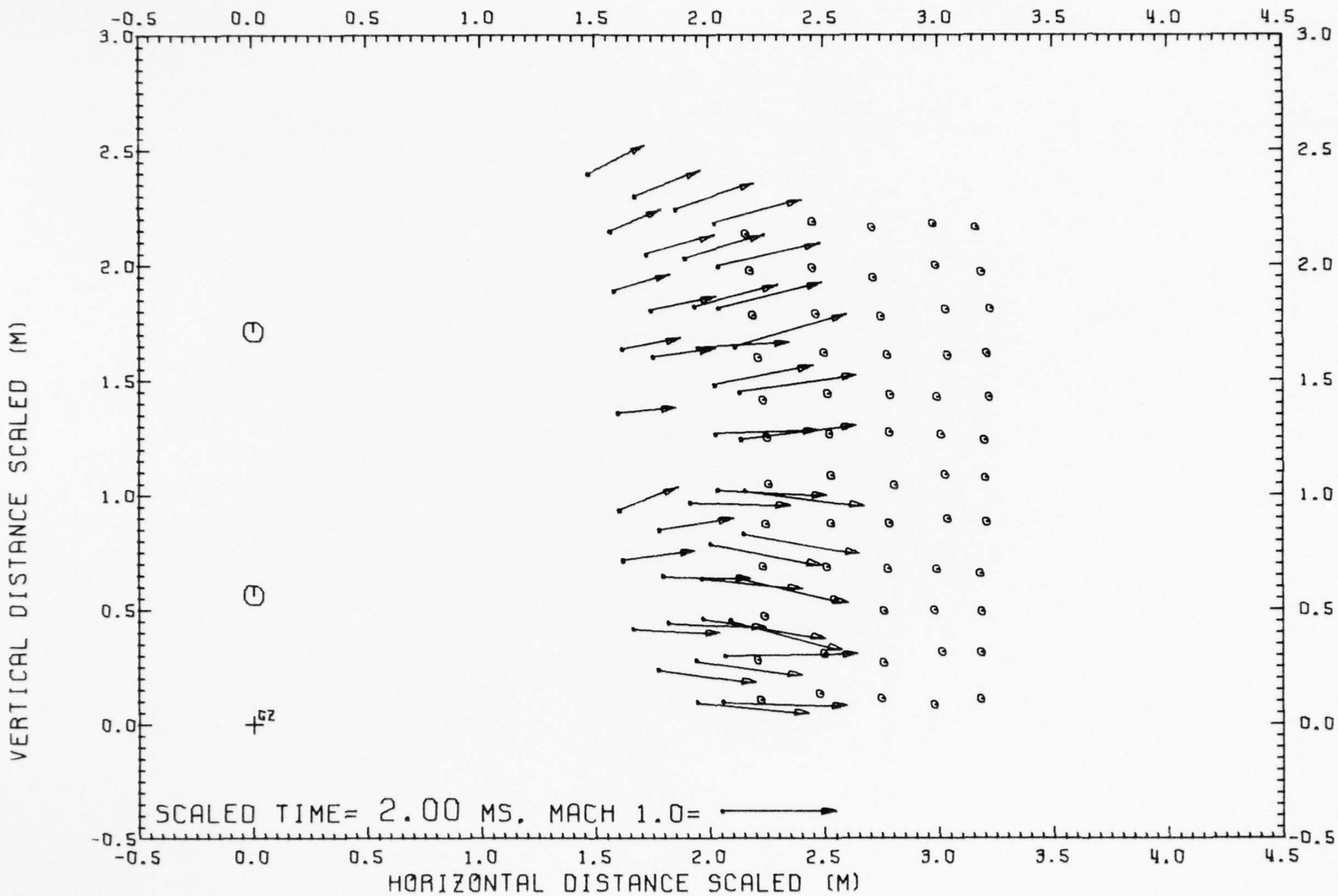

Fig. 12.11 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

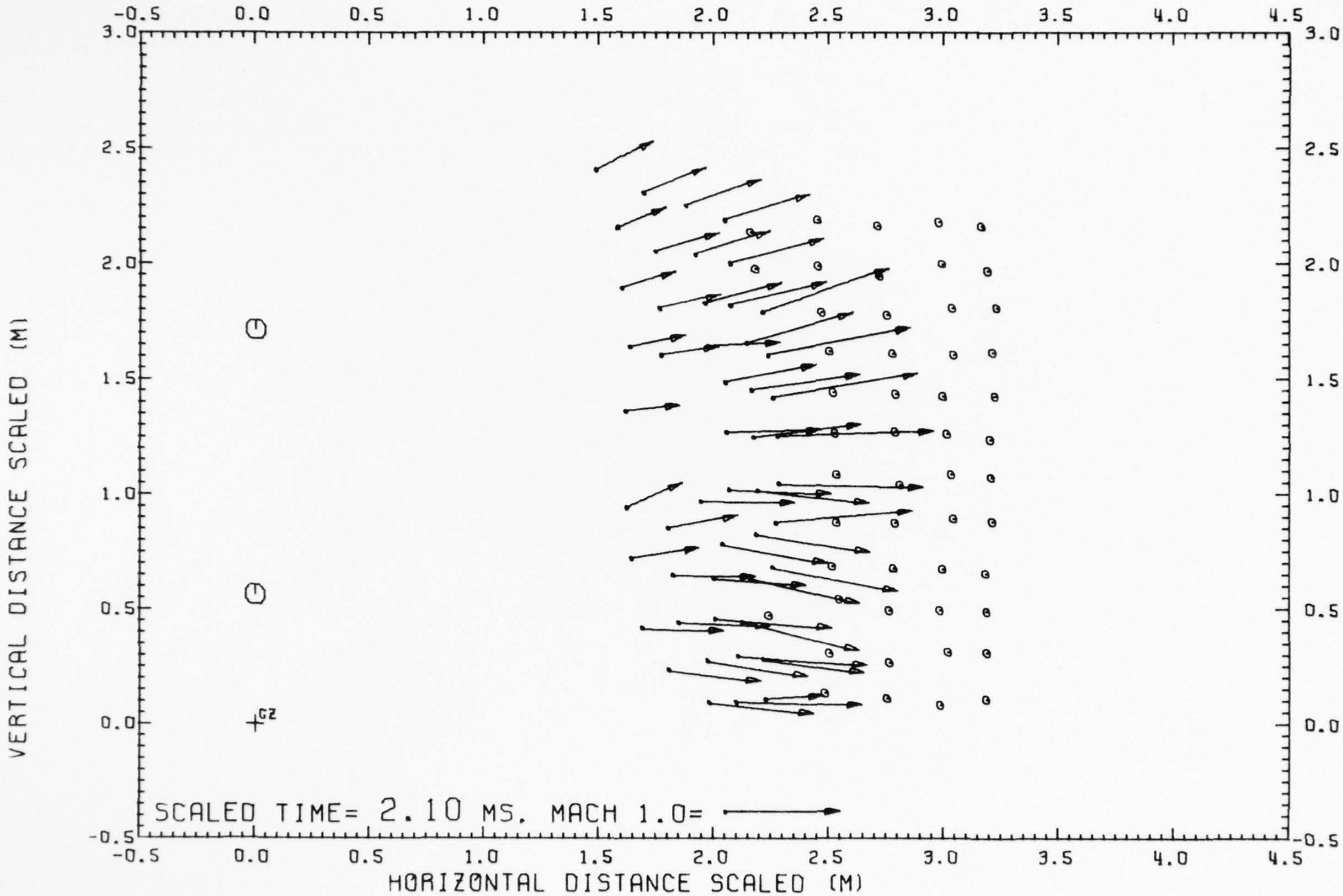

Fig. 12.12 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

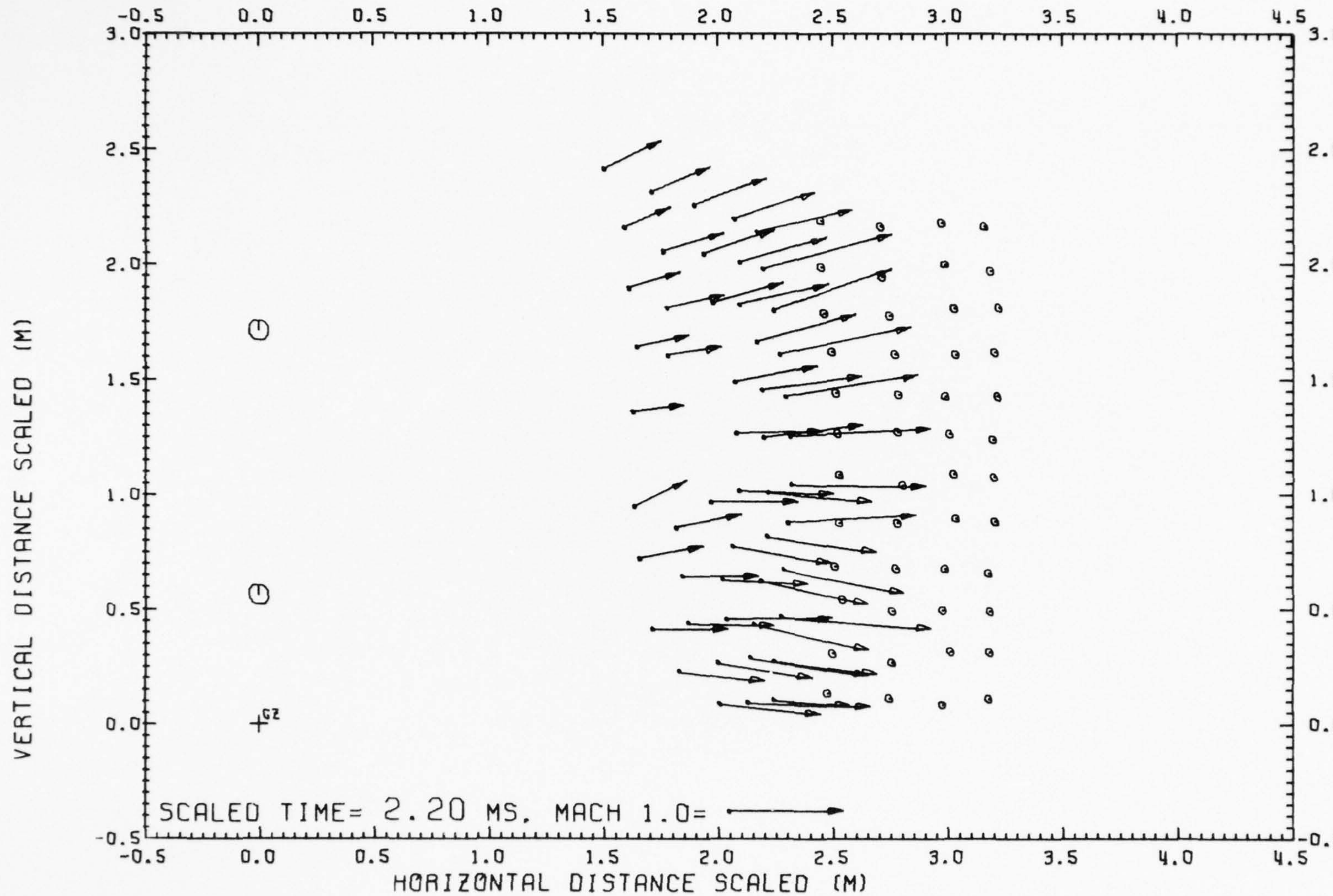

Fig. 12.13 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

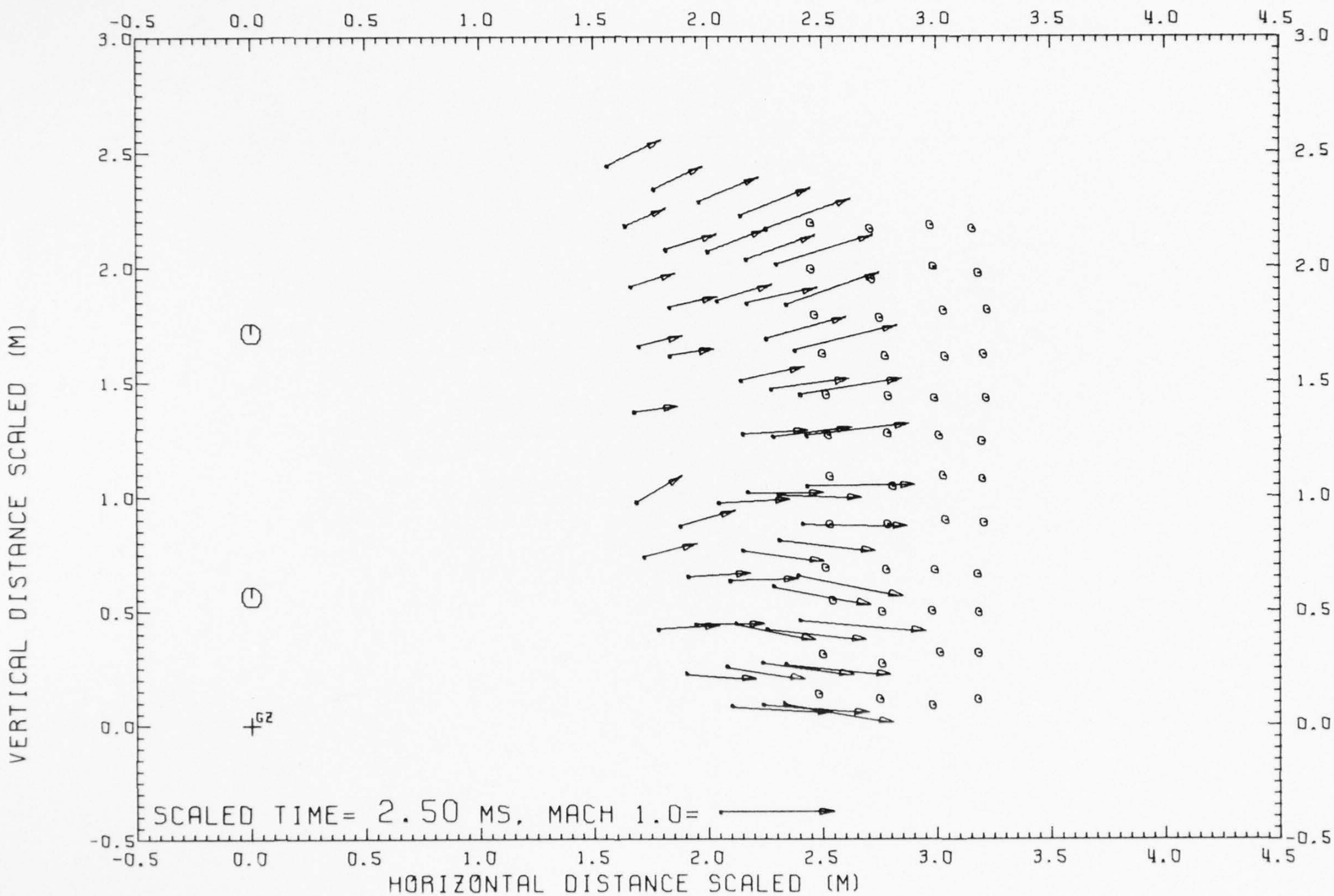

Fig. 12.14 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

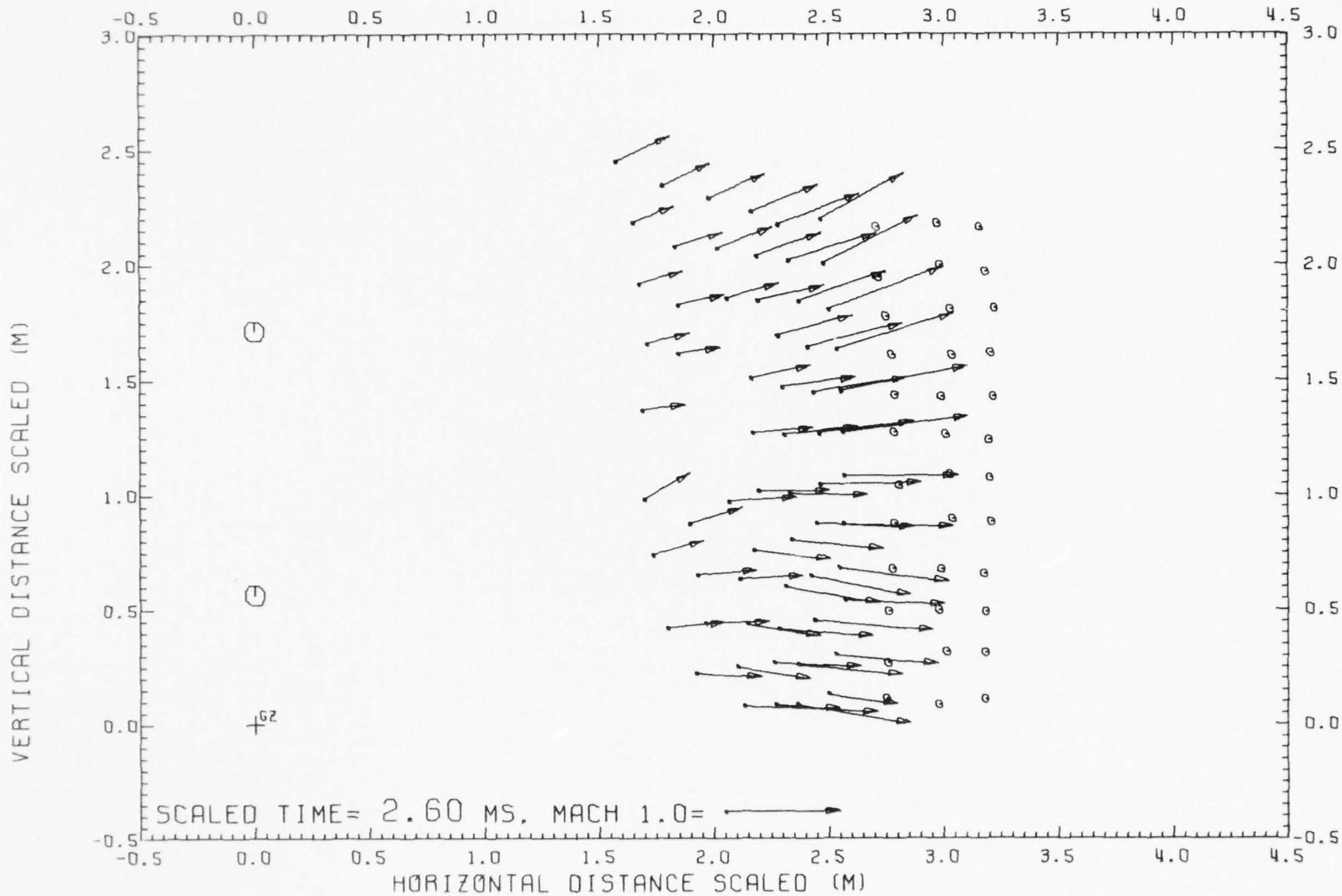

Fig. 12.15 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

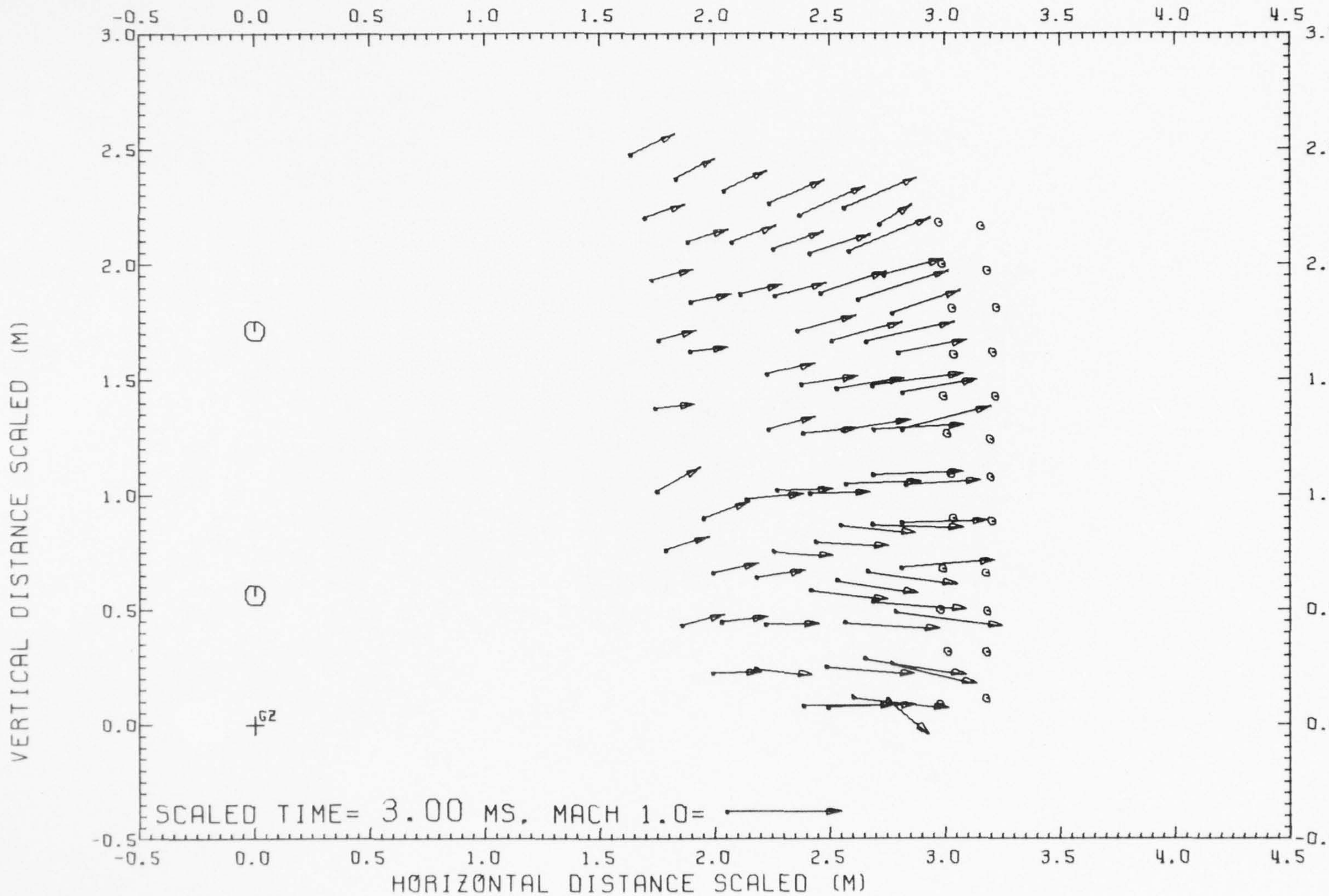

Fig. 12.16 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

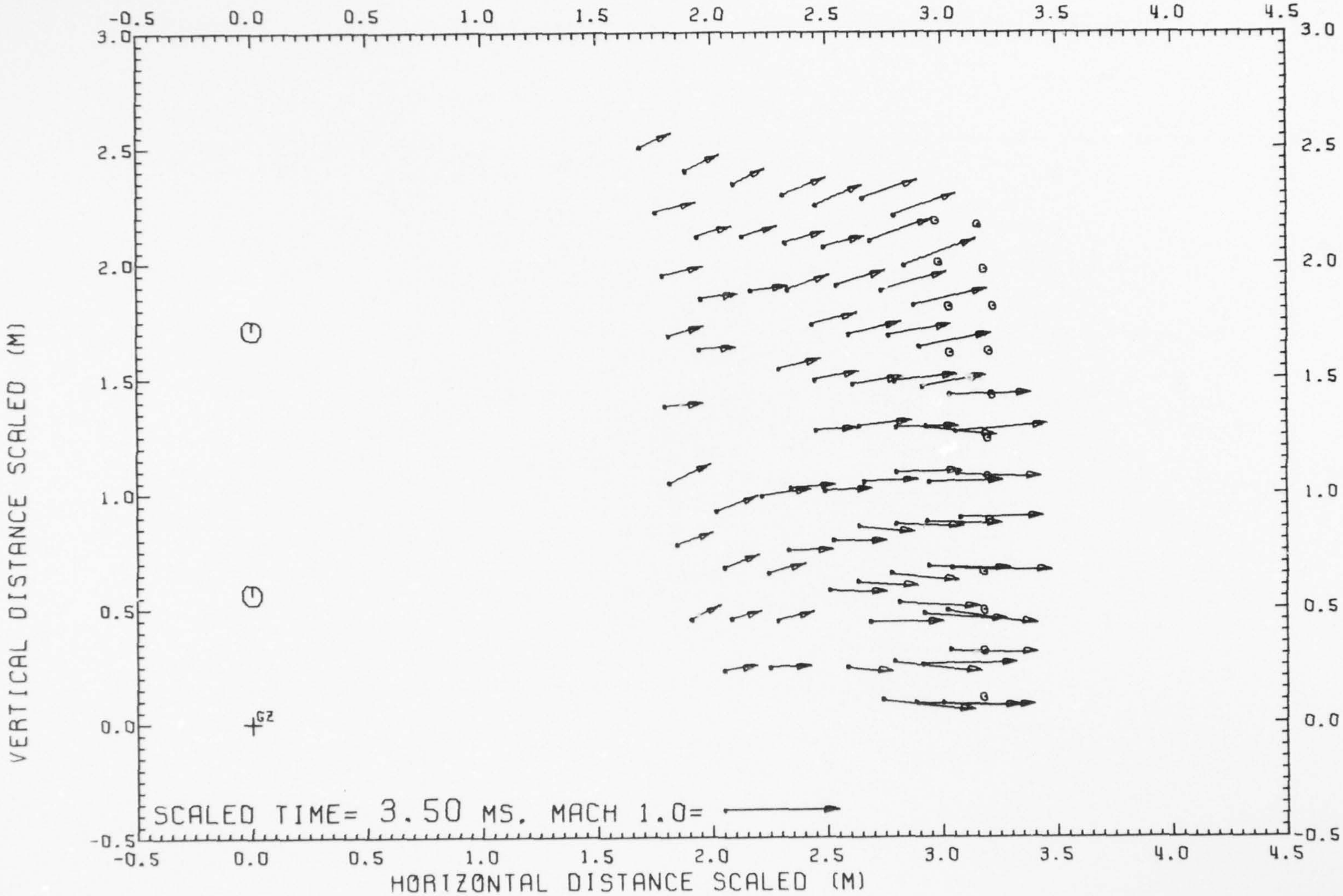

Fig. 12.17 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

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PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOT--ETC(U)
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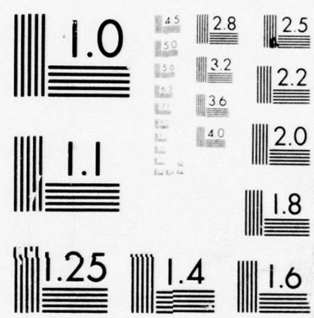

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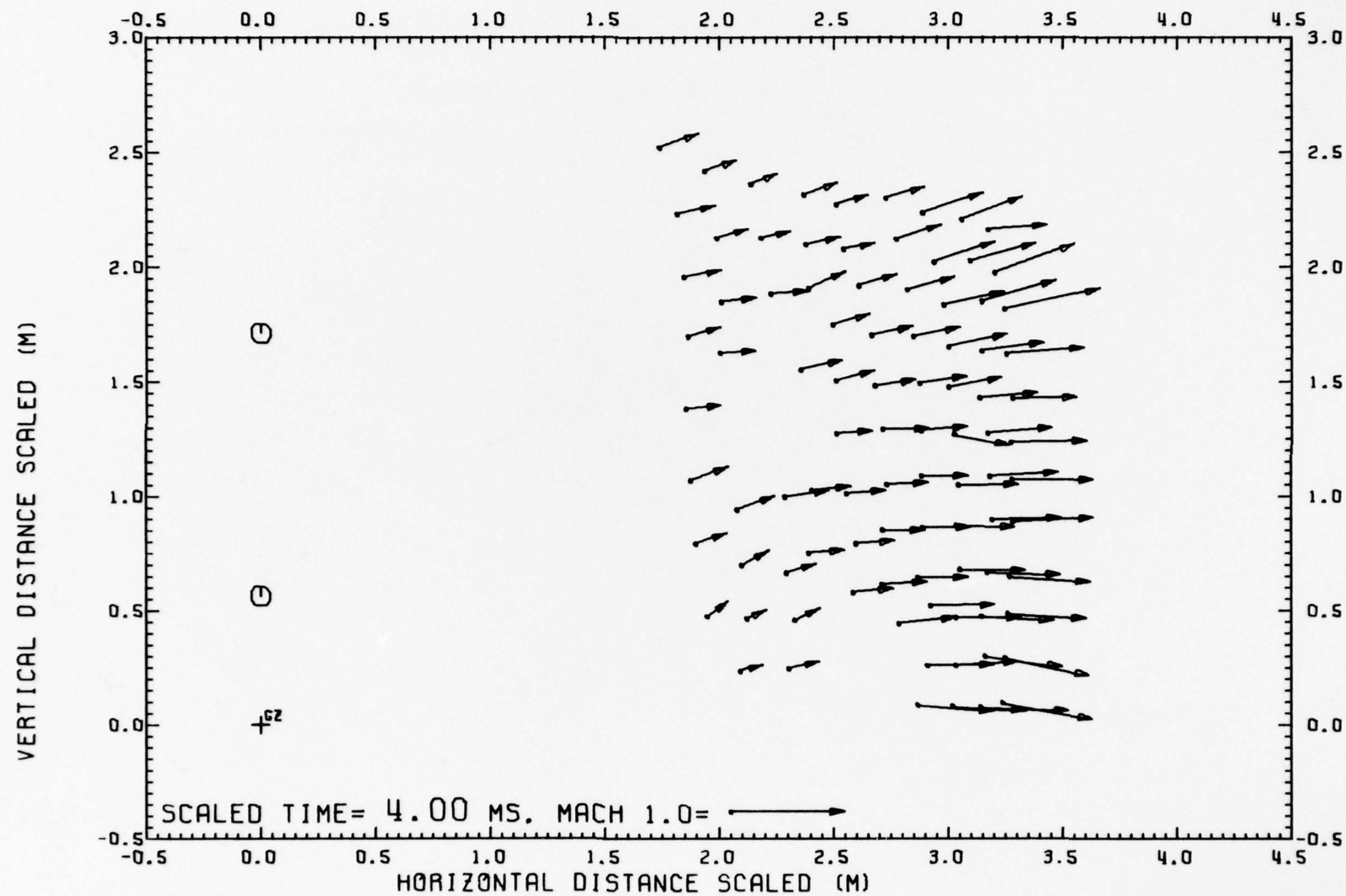


Fig. 12.18 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

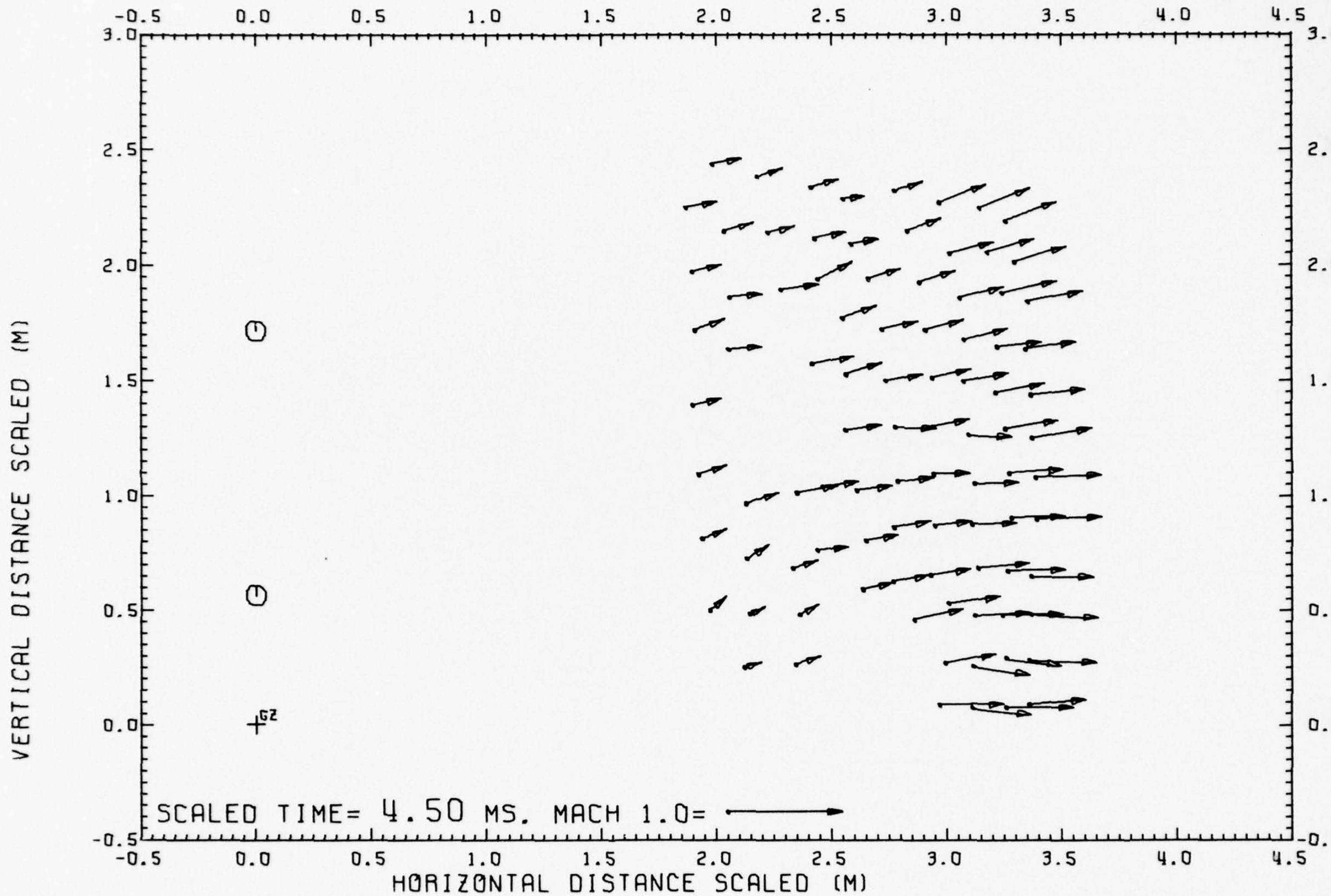


Fig. 12.19 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

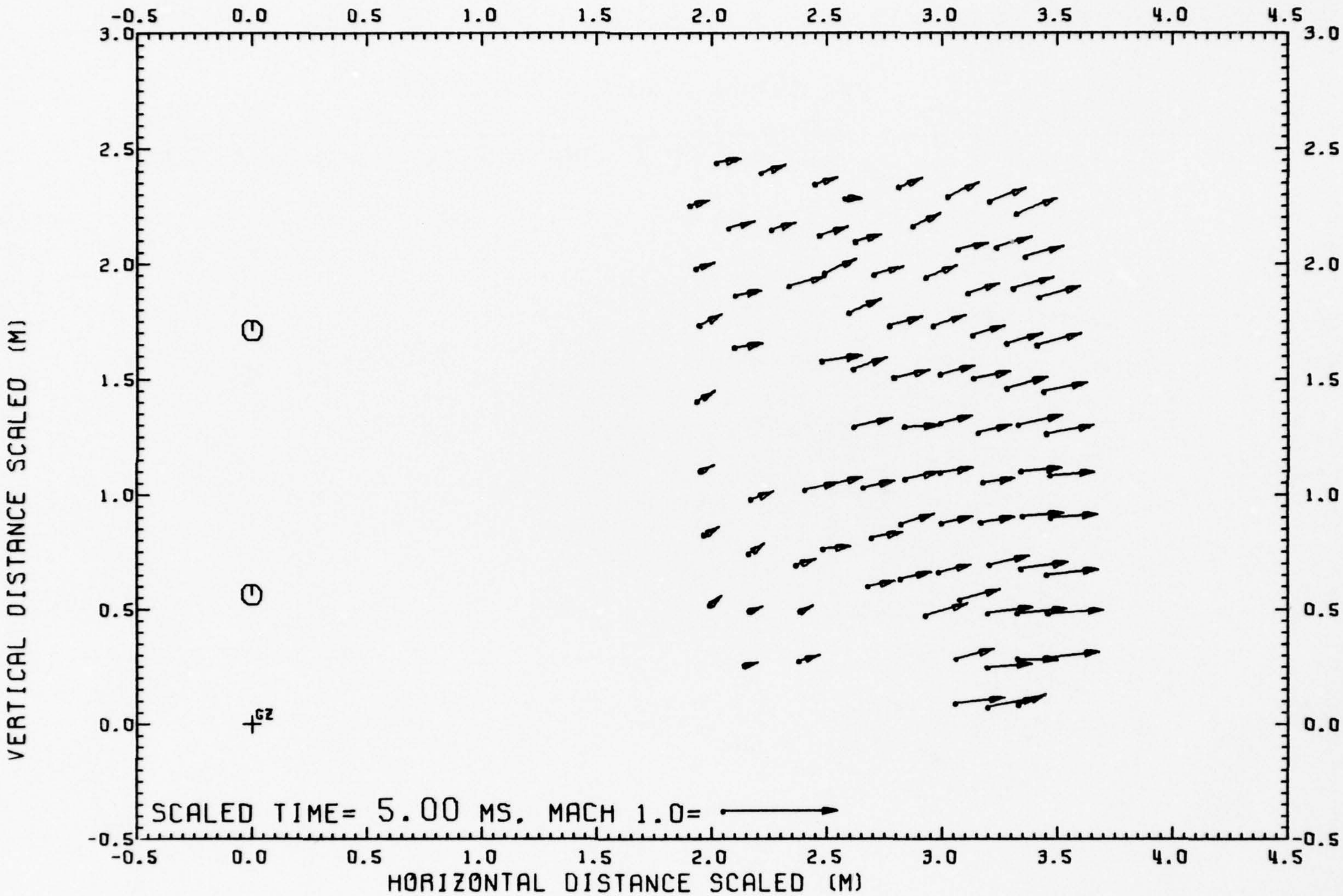


Fig. 12.20 PARTICLE VELOCITY FIELD. DIPOLE WEST/10

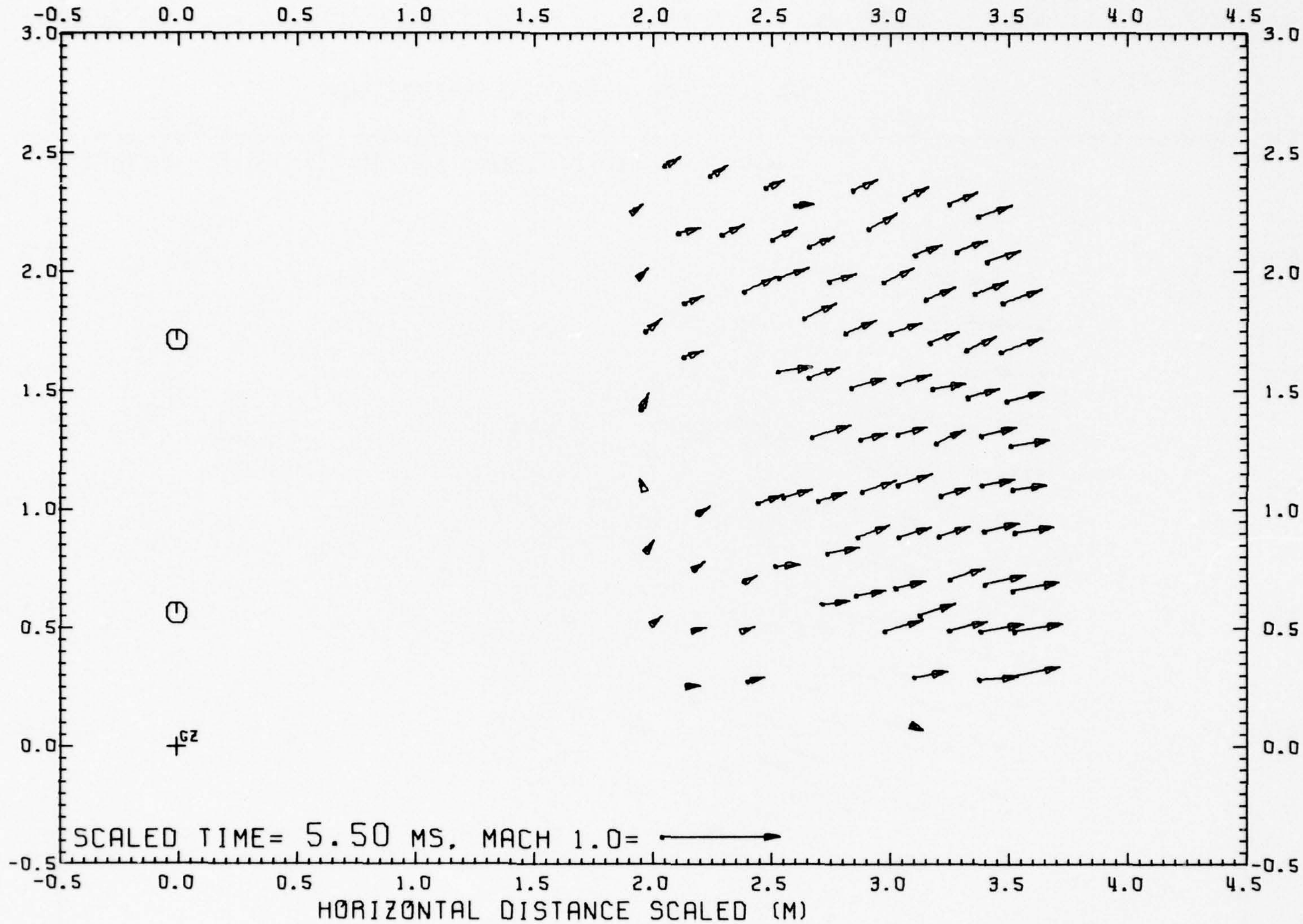


Fig. 12.21 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

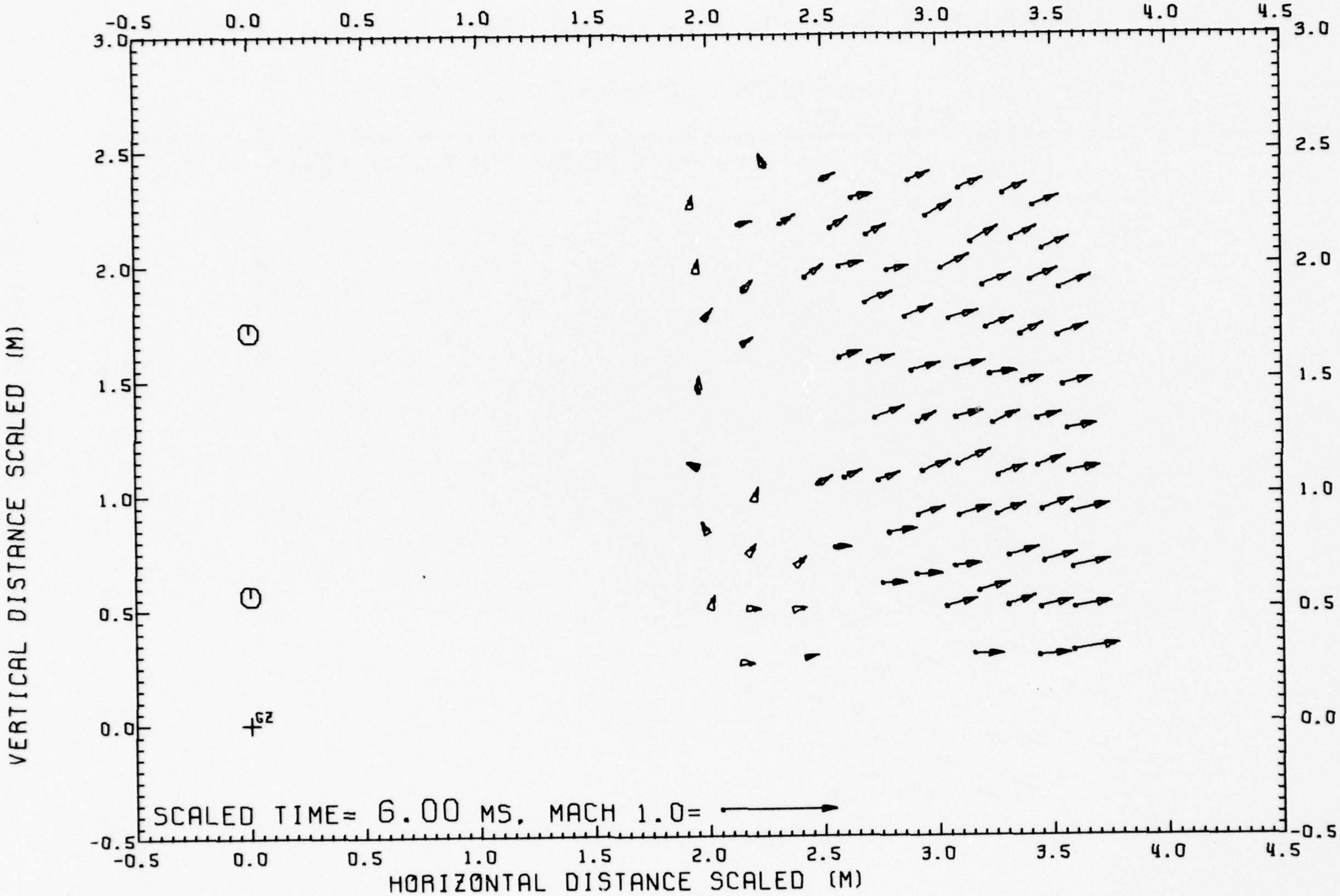


Fig. 12.22 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

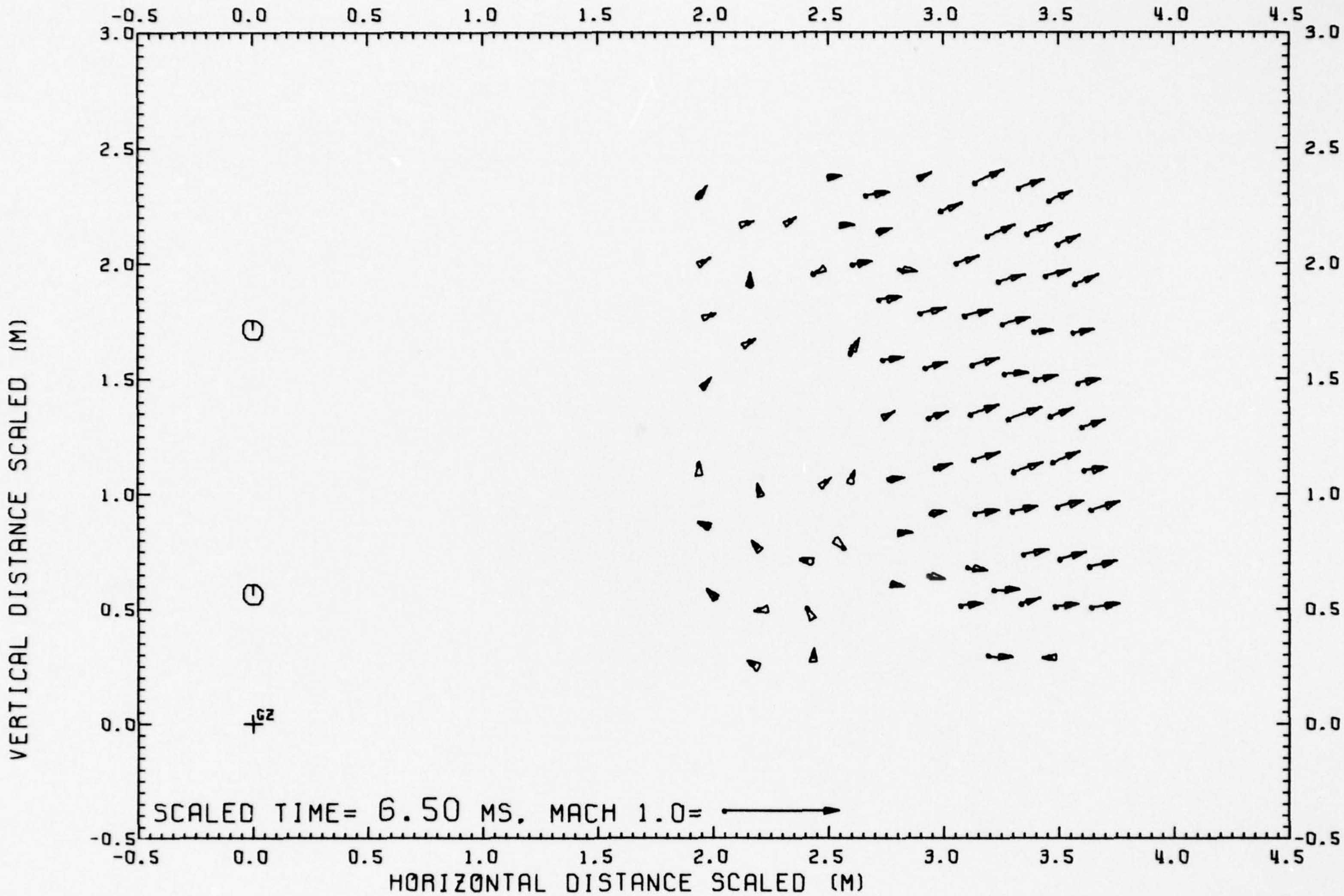


Fig. 12.23 PARTICLE VELOCITY FIELD, DIPOLE WEST/10

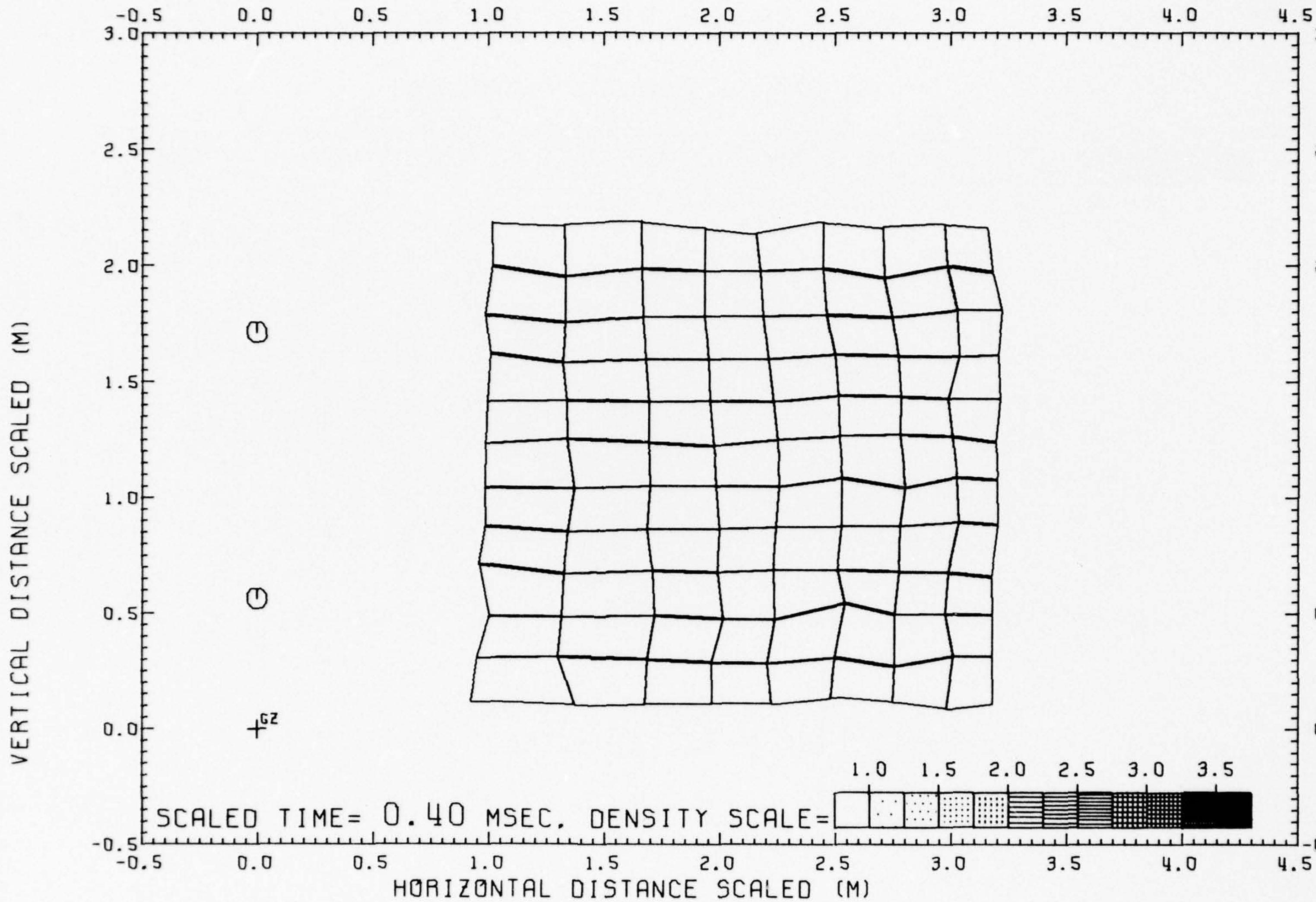


Fig. 13.1 DENSITY FIELD, DIPOLE WEST/10

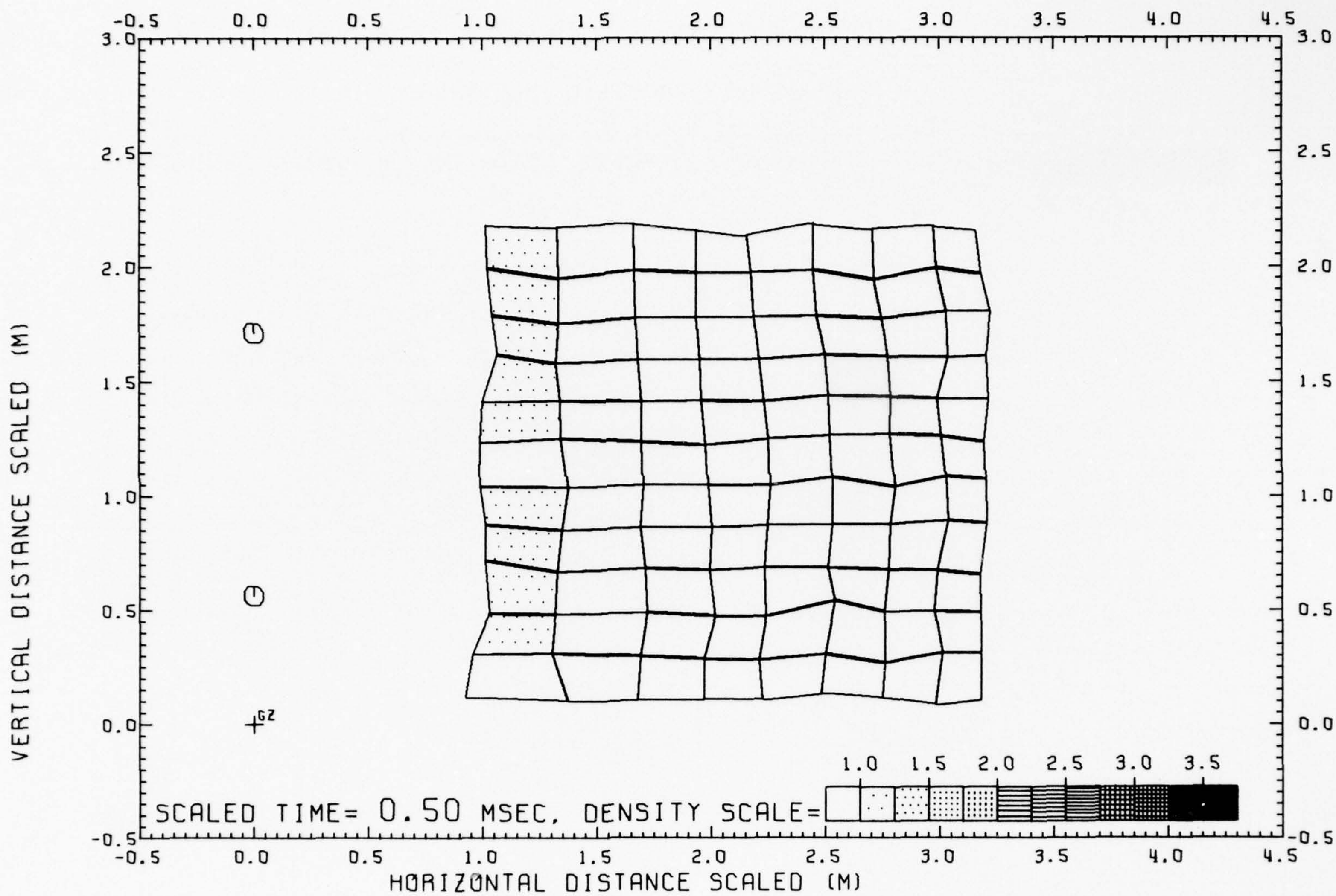


Fig. 13.2 DENSITY FIELD, DIPOLE WEST/10

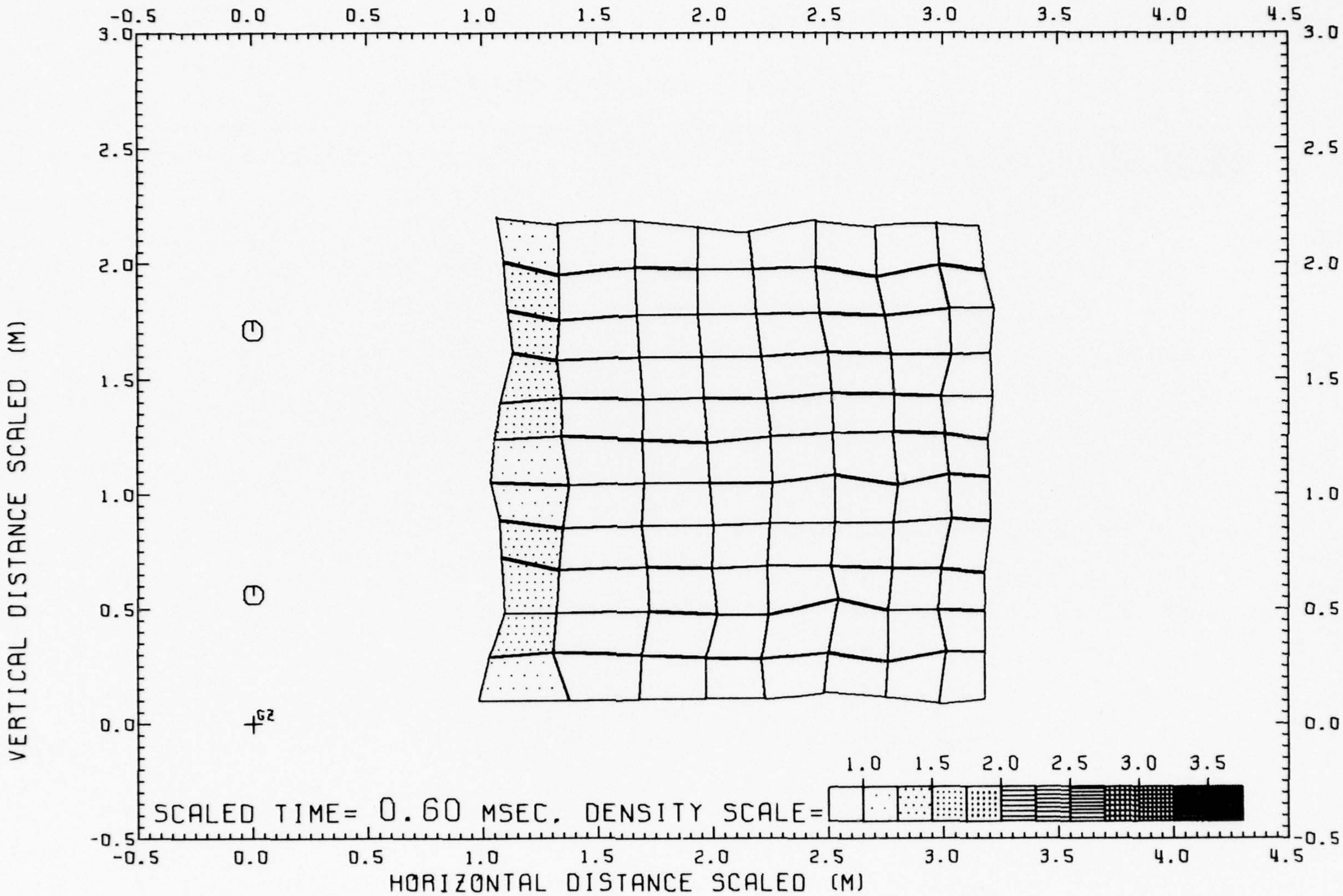


Fig. 13.3 DENSITY FIELD, DIPOLE WEST/10

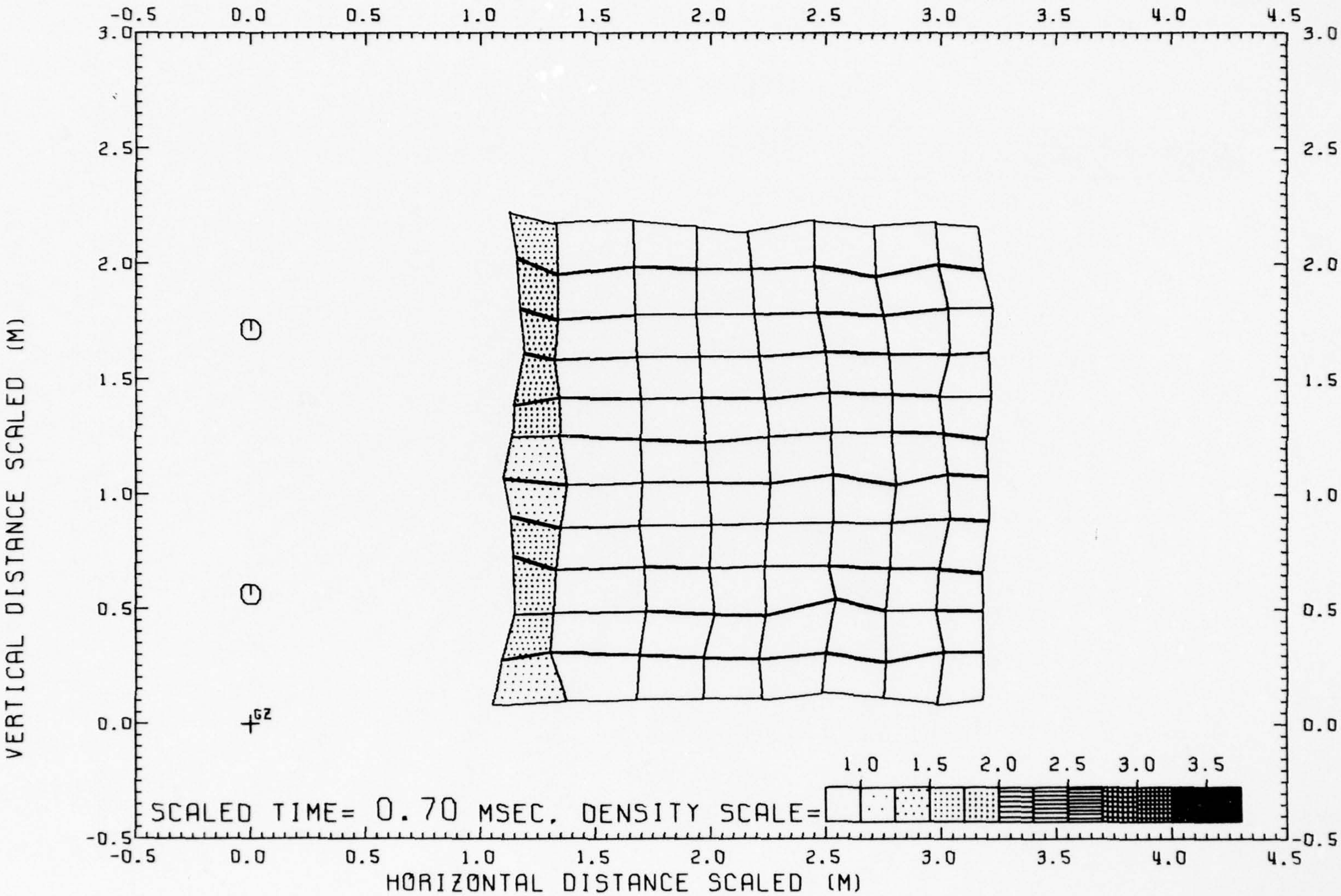


Fig. 13.4 DENSITY FIELD, DIPOLE WEST/10

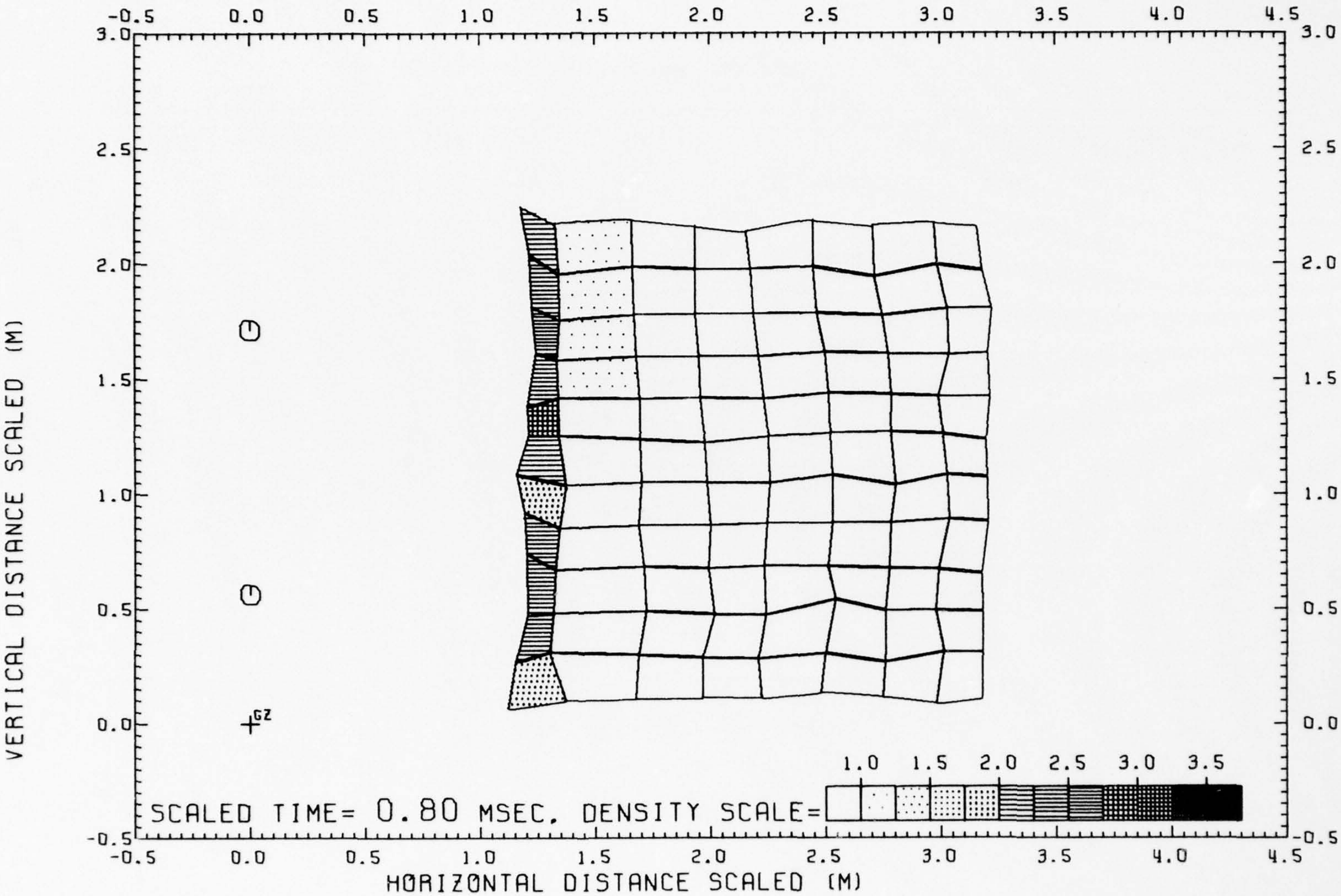


Fig. 13.5 DENSITY FIELD, DIPOLE WEST/10

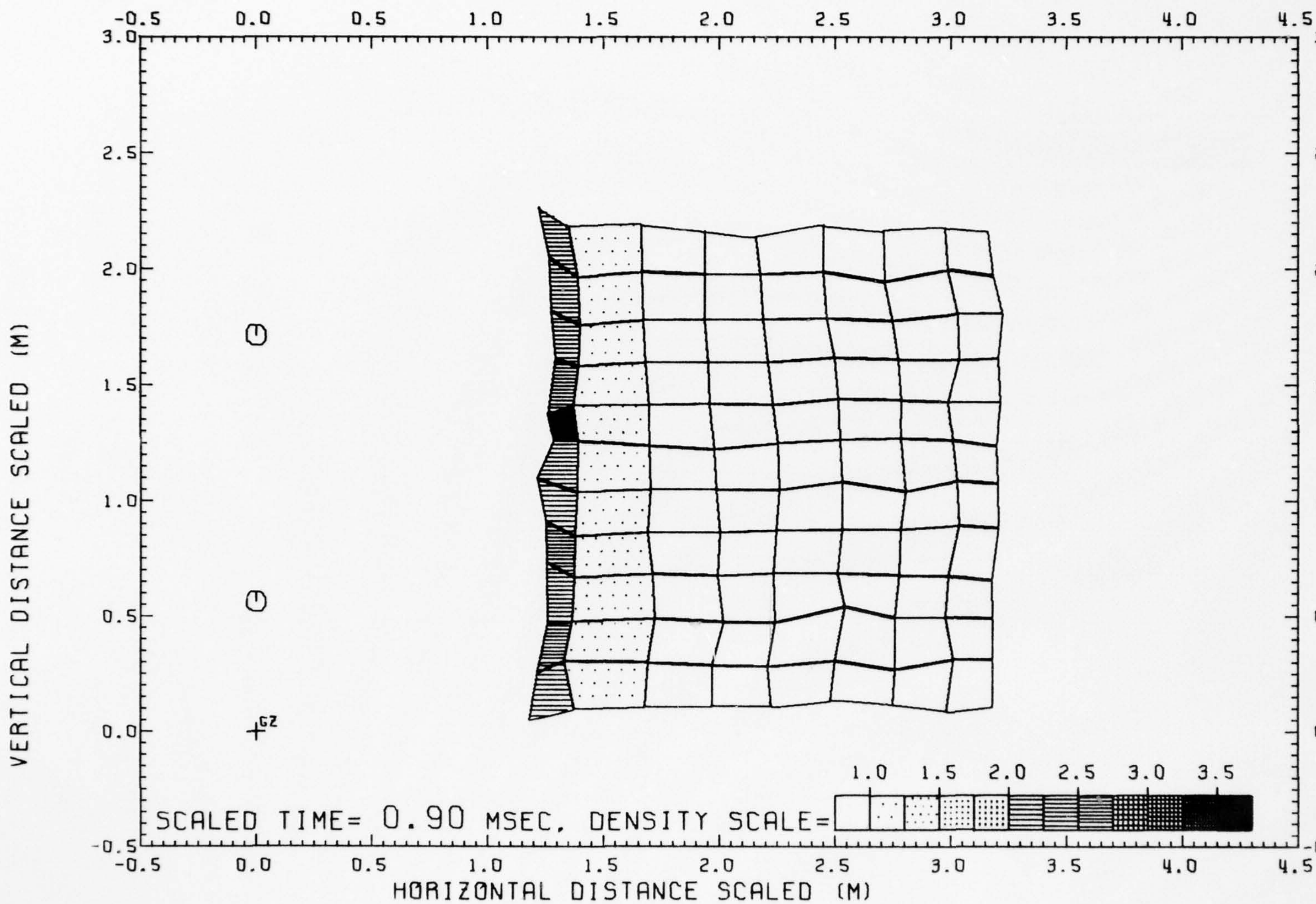


Fig. 13.6 DENSITY FIELD, DIPOLE WEST/10

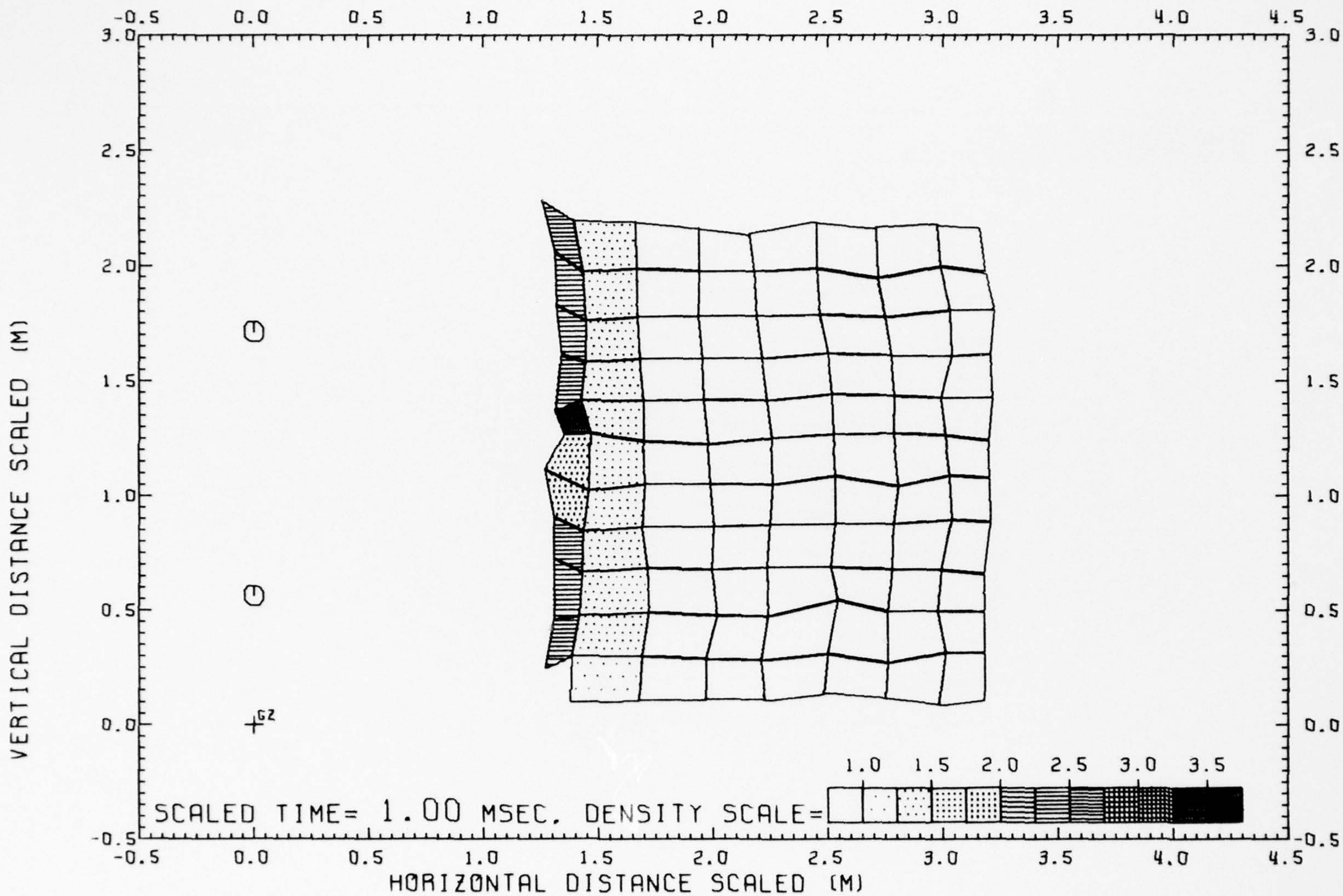


Fig. 13.7 DENSITY FIELD, DIPOLE WEST/10

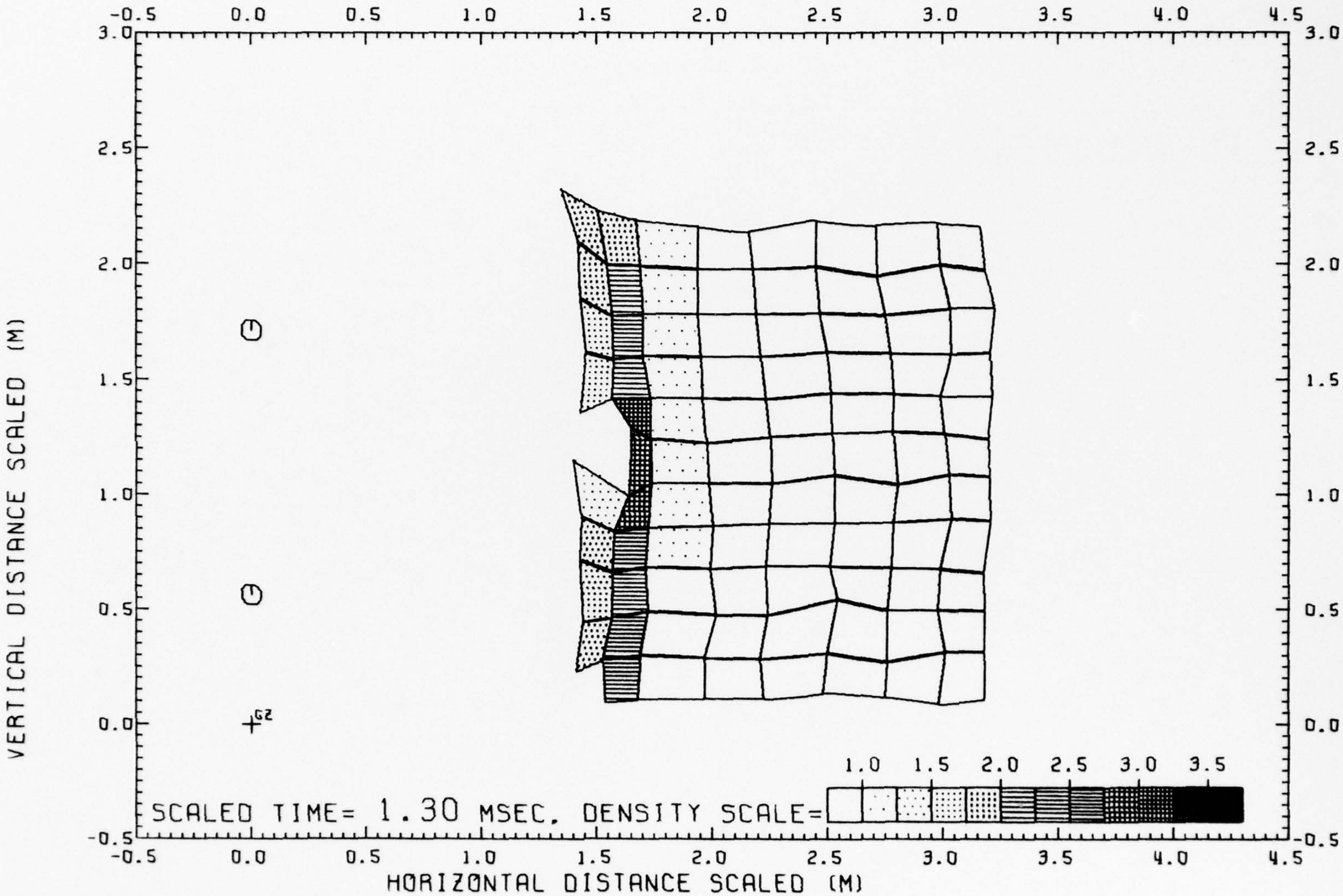


Fig. 13.8 DENSITY FIELD, DIPOLE WEST/10

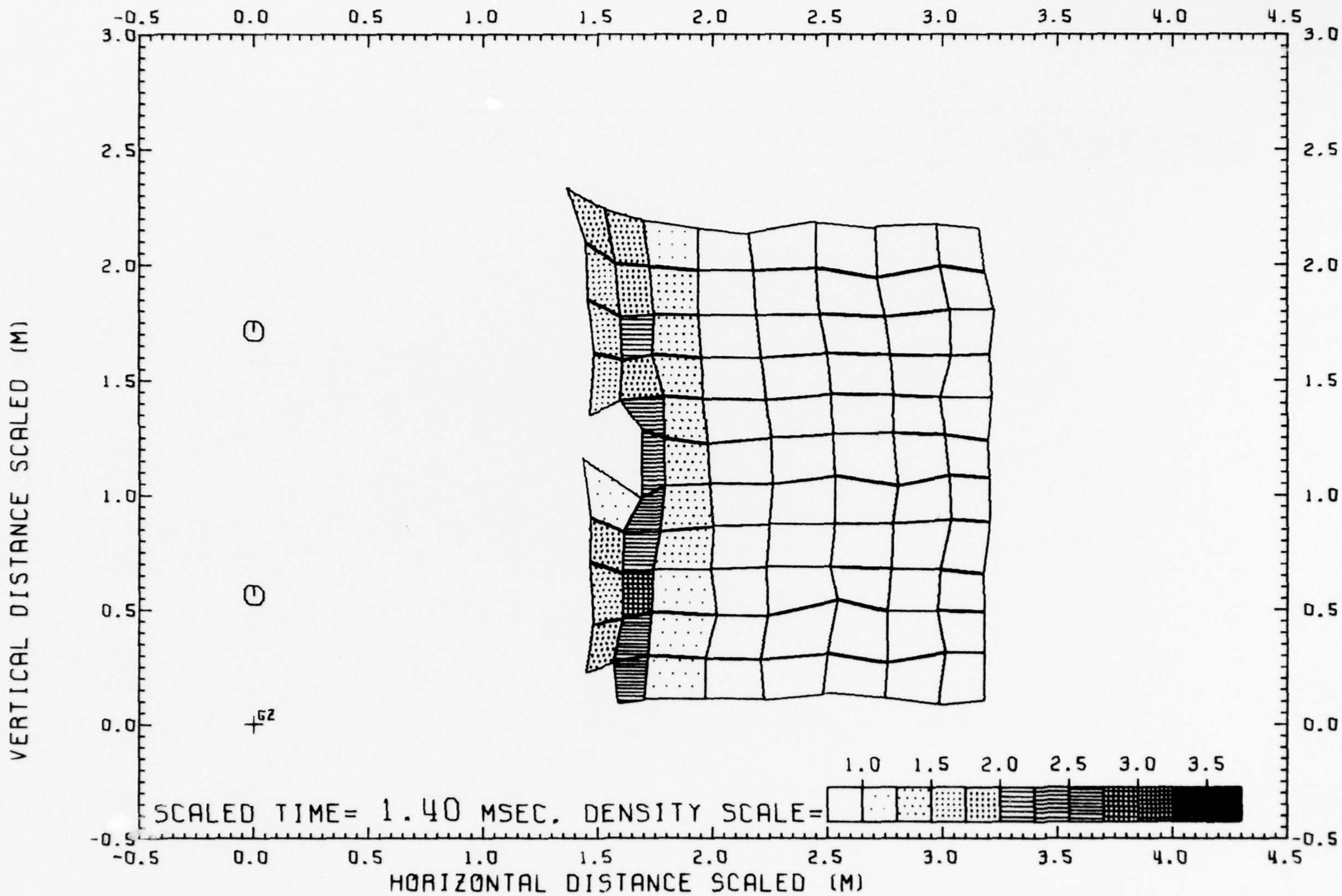


Fig. 13.9 DENSITY FIELD, DIPOLE WEST/10

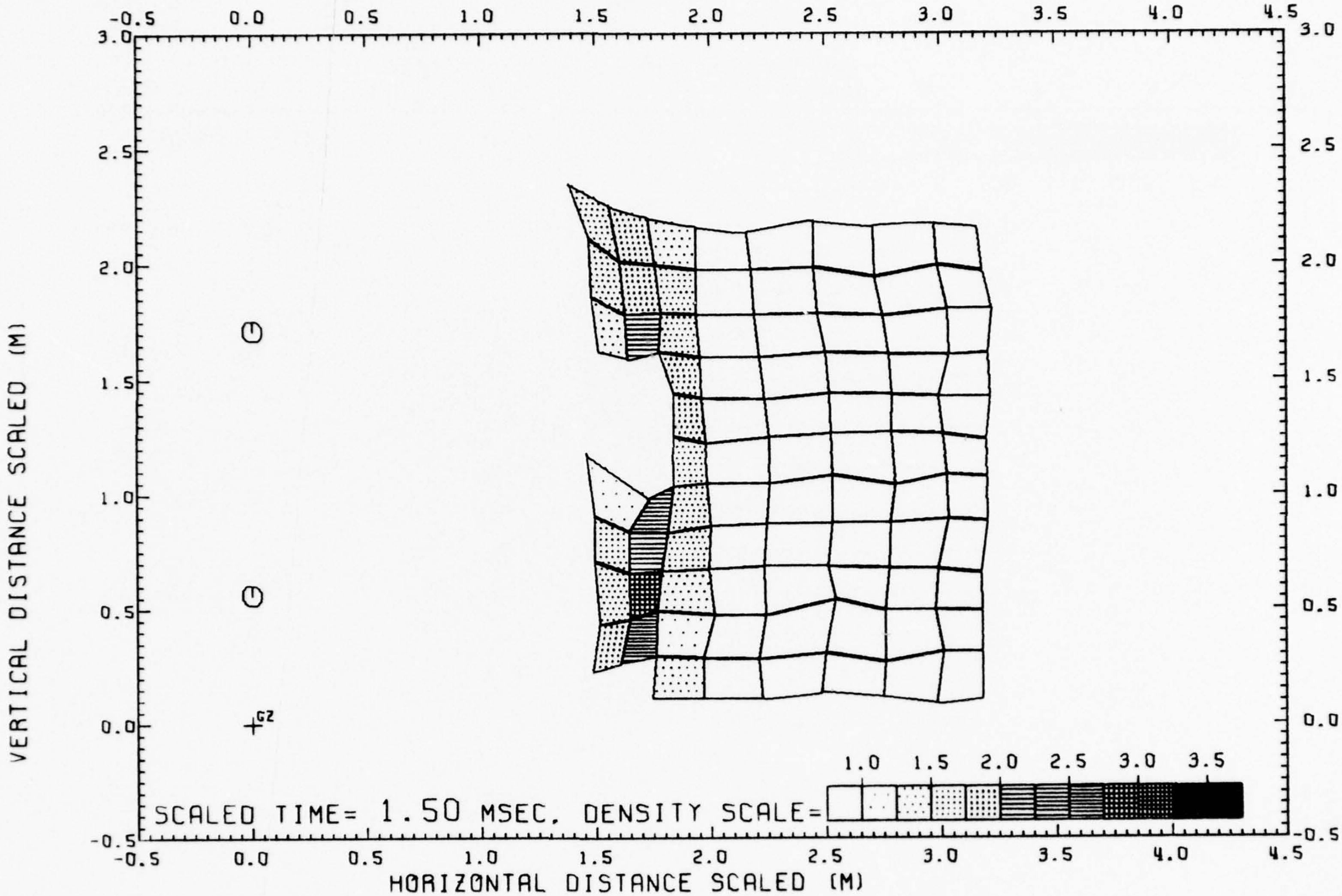


Fig. 13.10 DENSITY FIELD. DIPOLE WEST/10

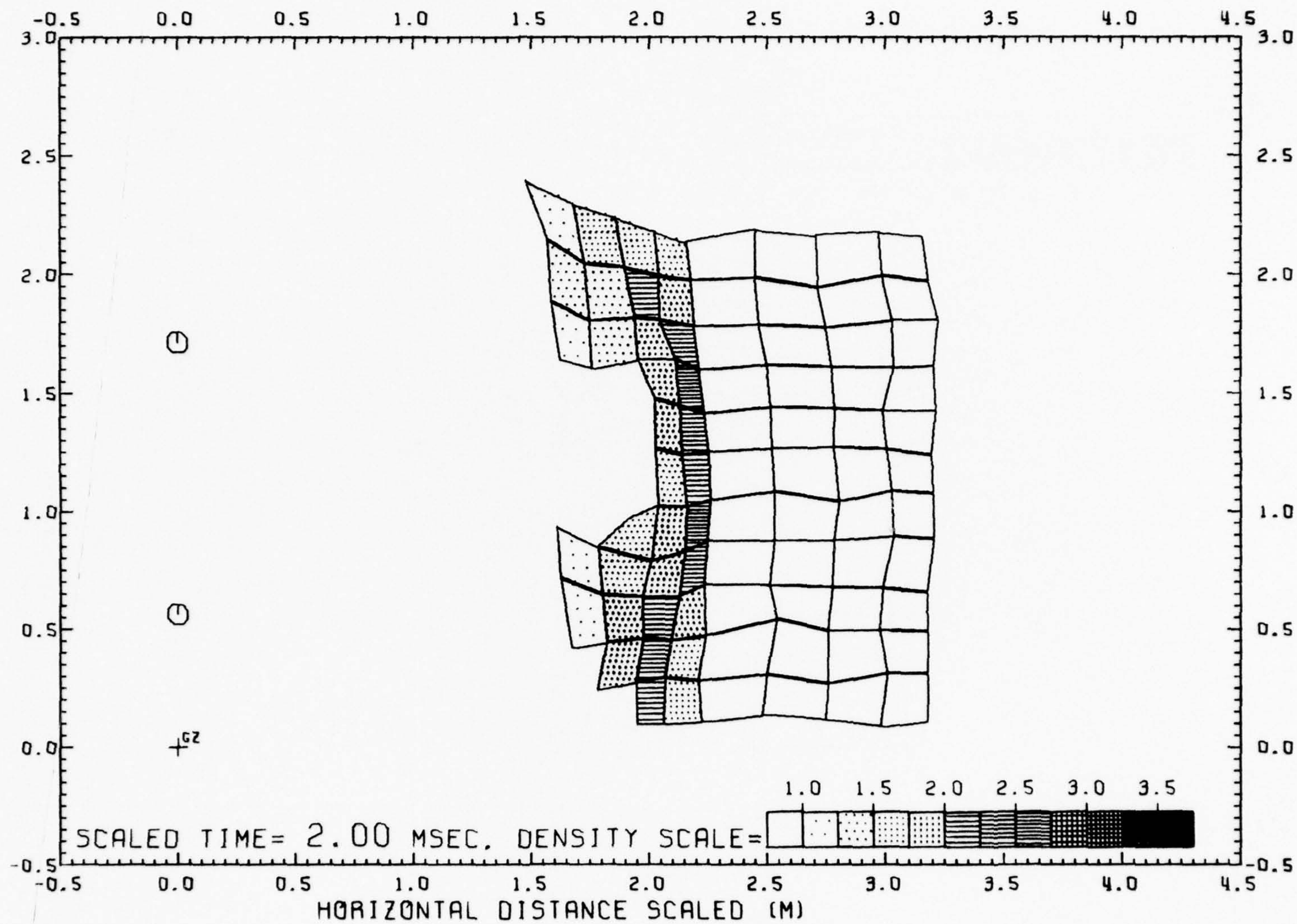


Fig. 13.11 DENSITY FIELD, DIPOLE WEST/10

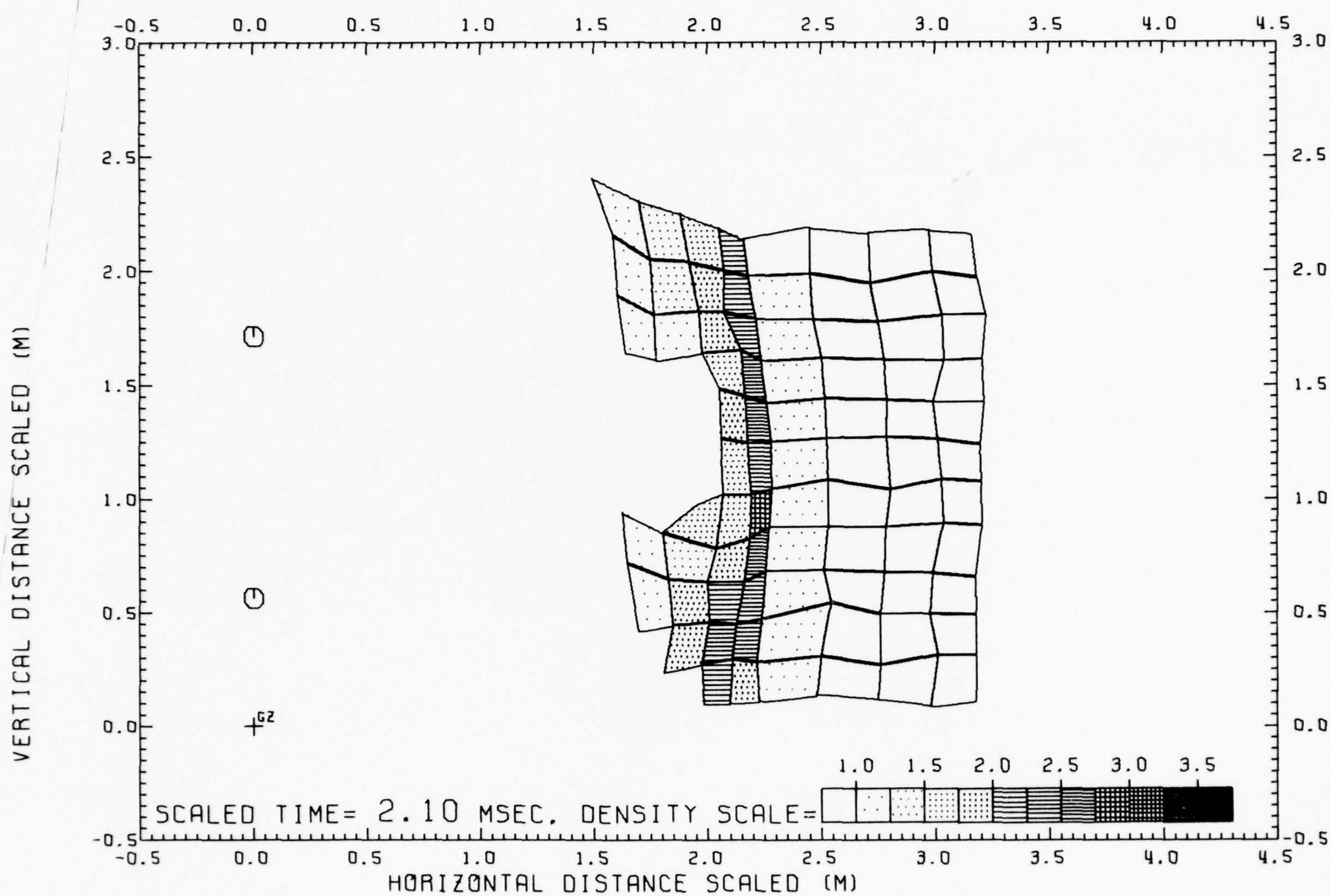


Fig. 13.12 DENSITY FIELD. DIPOLE WEST/10

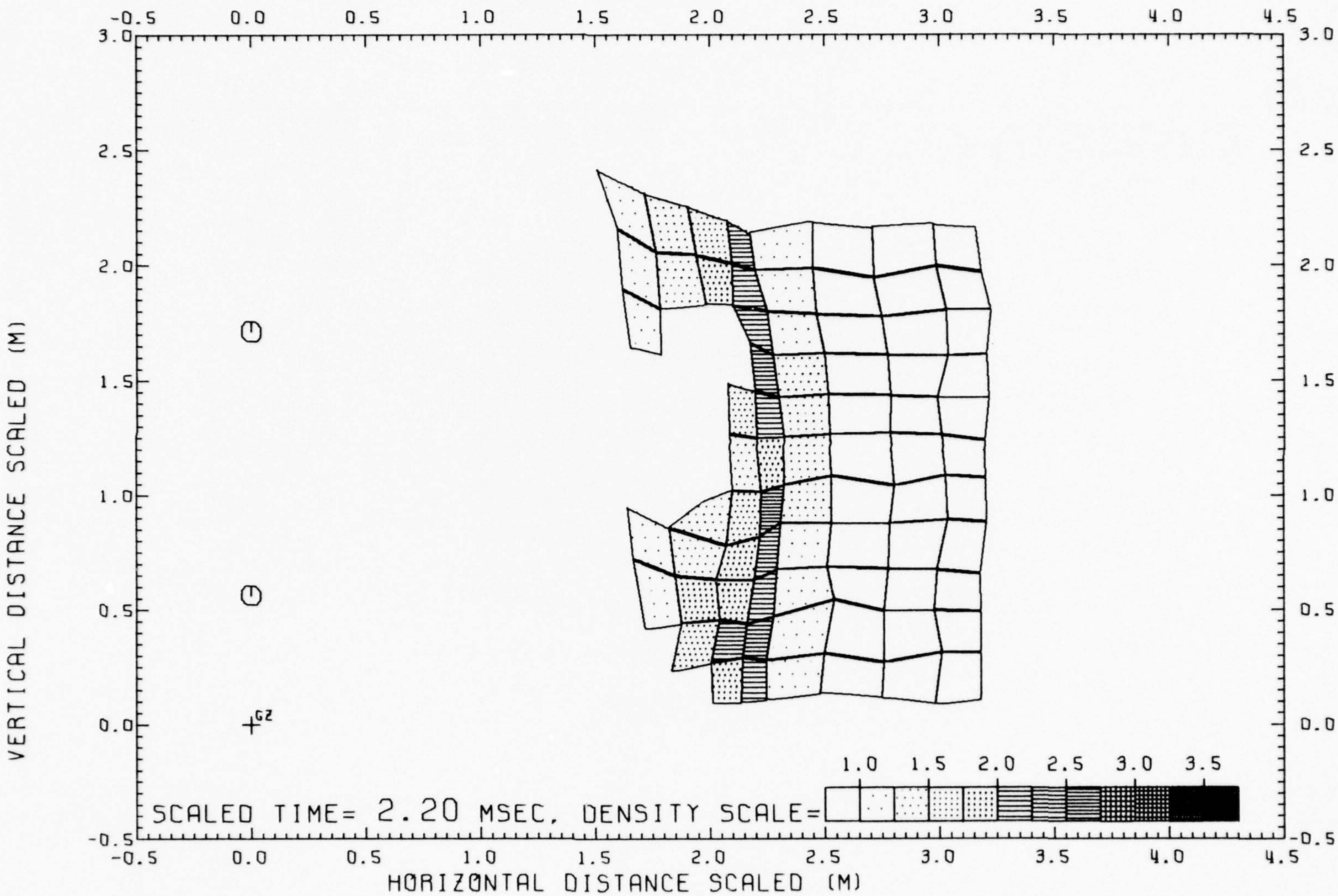


Fig. 13.13 DENSITY FIELD, DIPOLE WEST/10

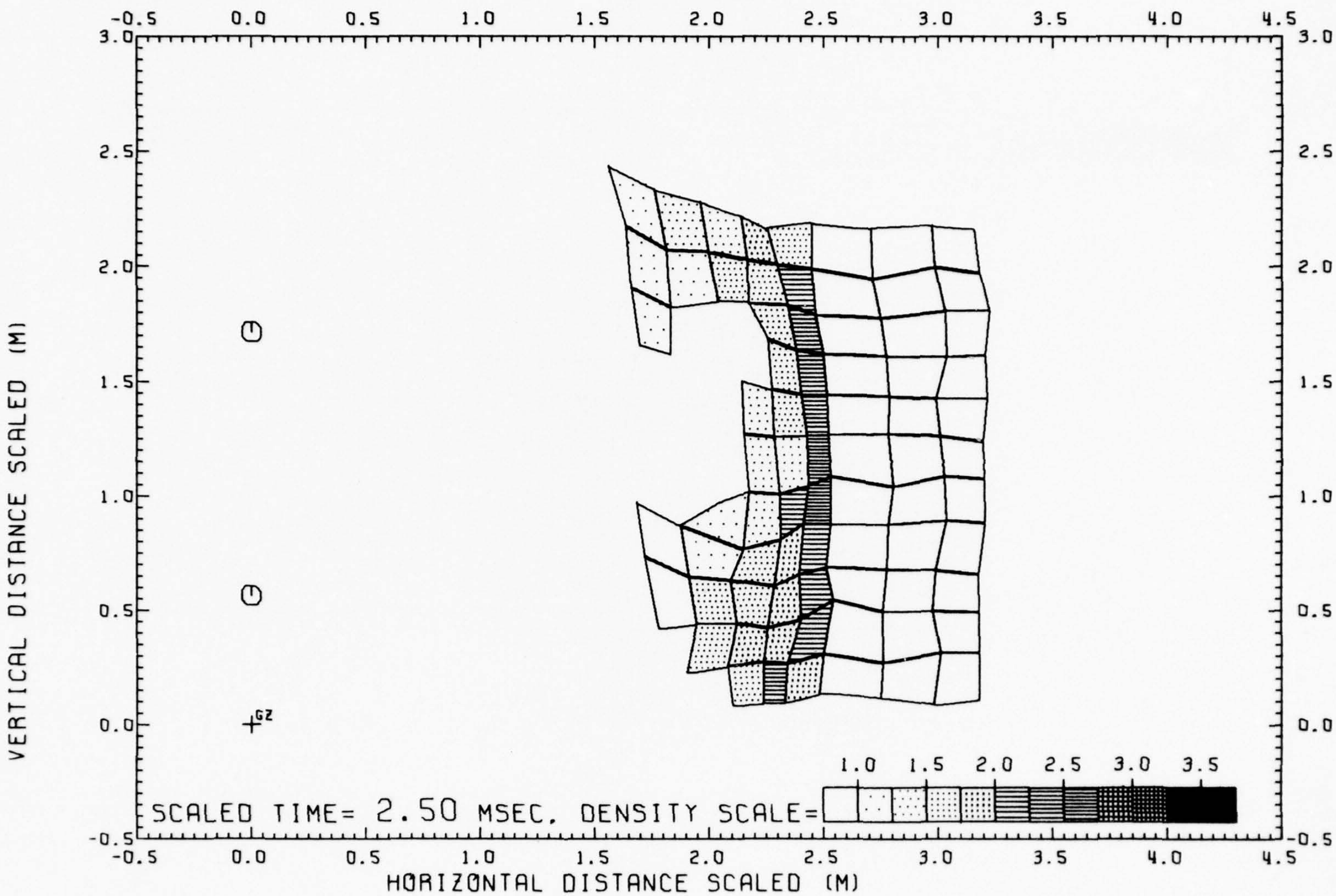


Fig. 13.14 DENSITY FIELD, DIPOLE WEST/10

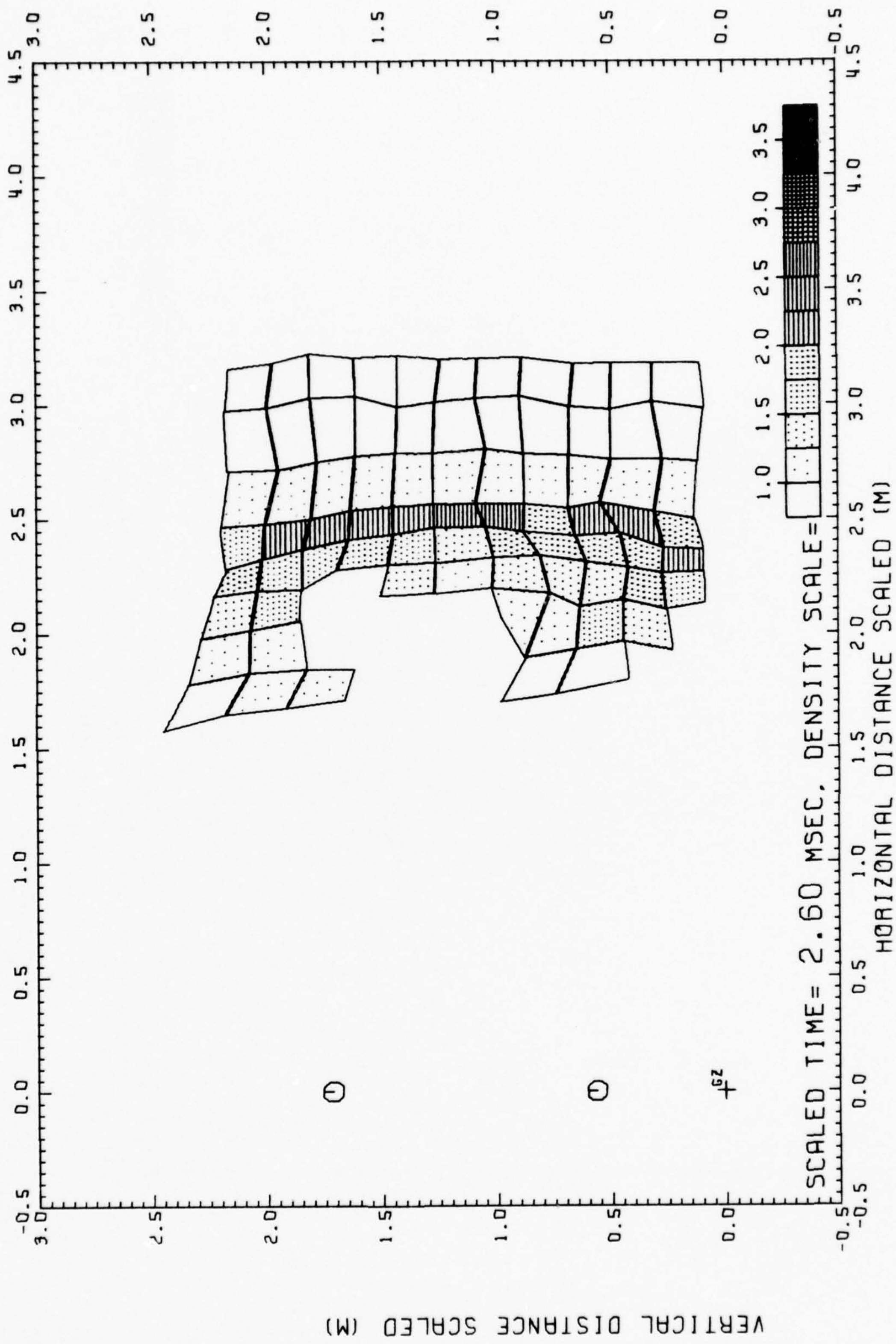


Fig. 13.15 DENSITY FIELD, DIPOLE WEST/10

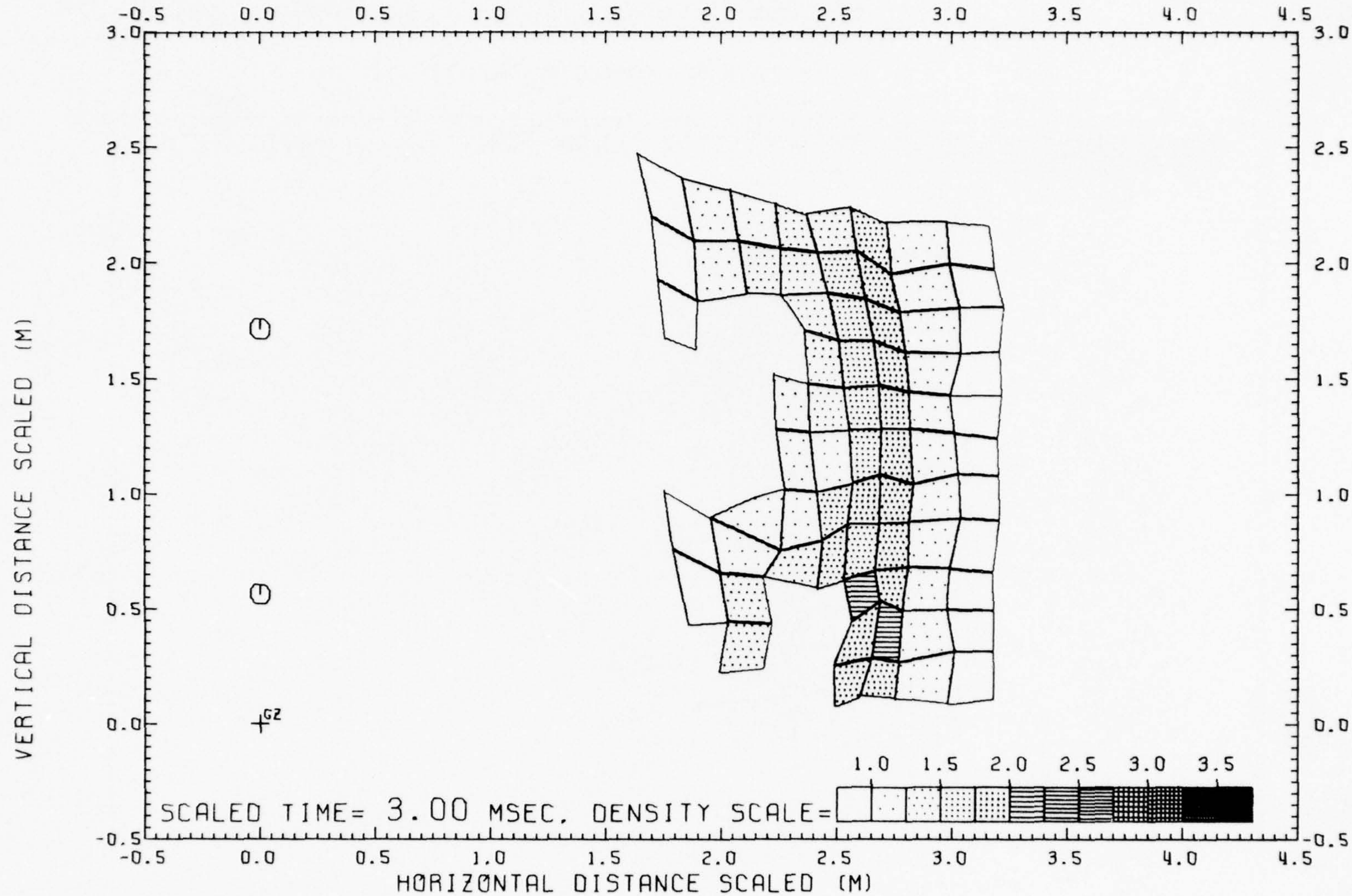


Fig. 13.16 DENSITY FIELD, DIPOLE WEST/10

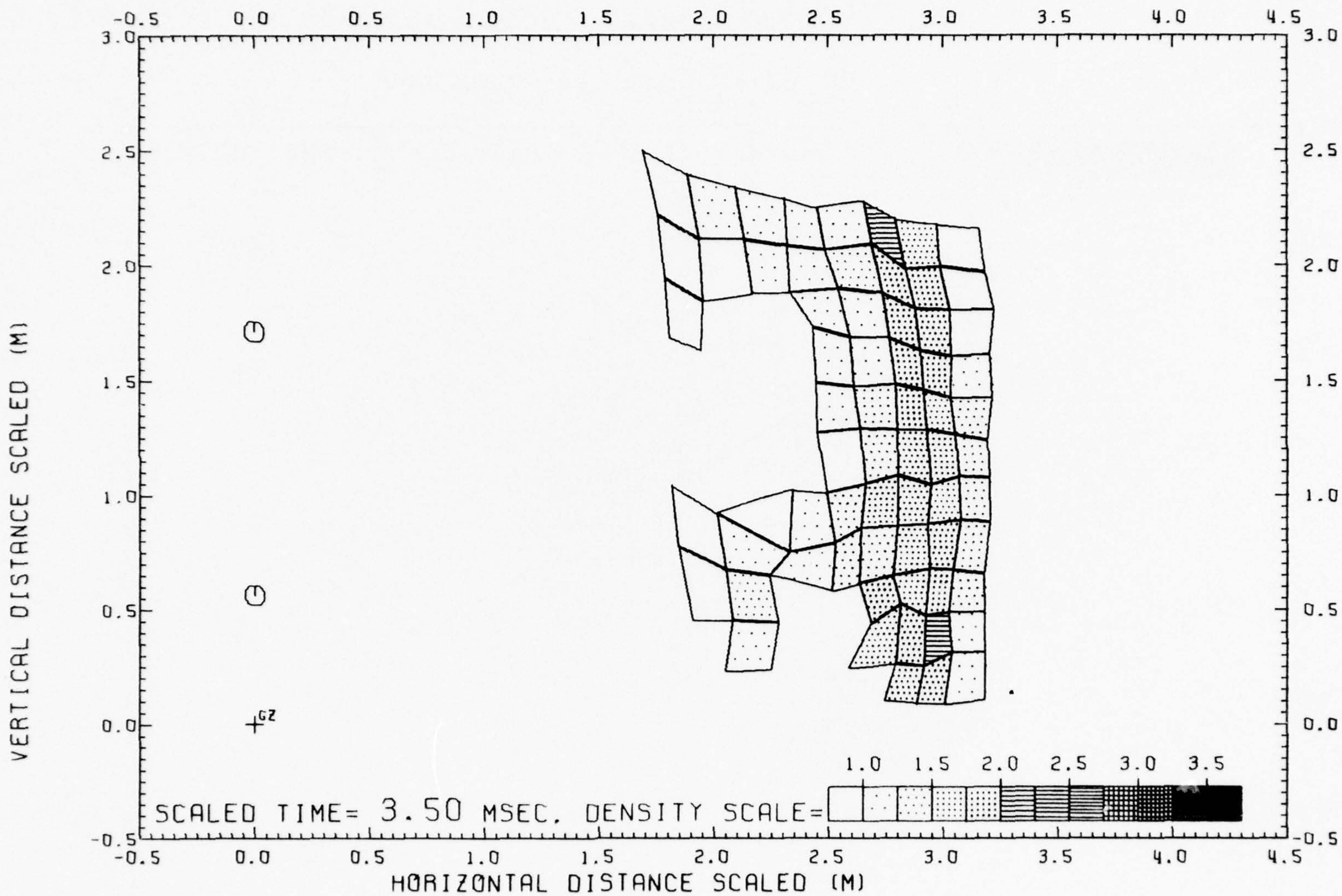


Fig. 13.17 DENSITY FIELD, DIPOLE WEST/10

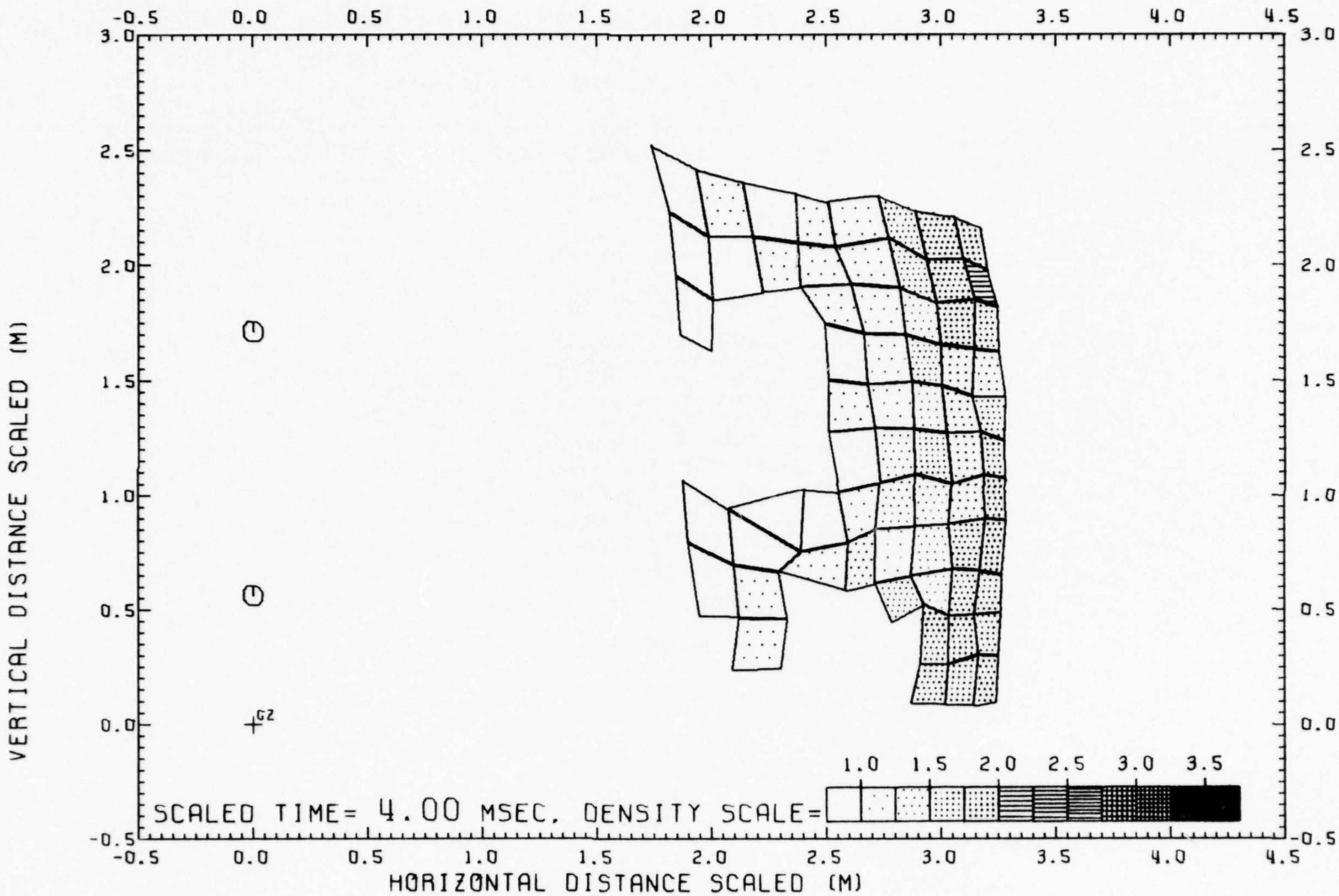


Fig. 13.18 DENSITY FIELD, DIPOLE WEST/10

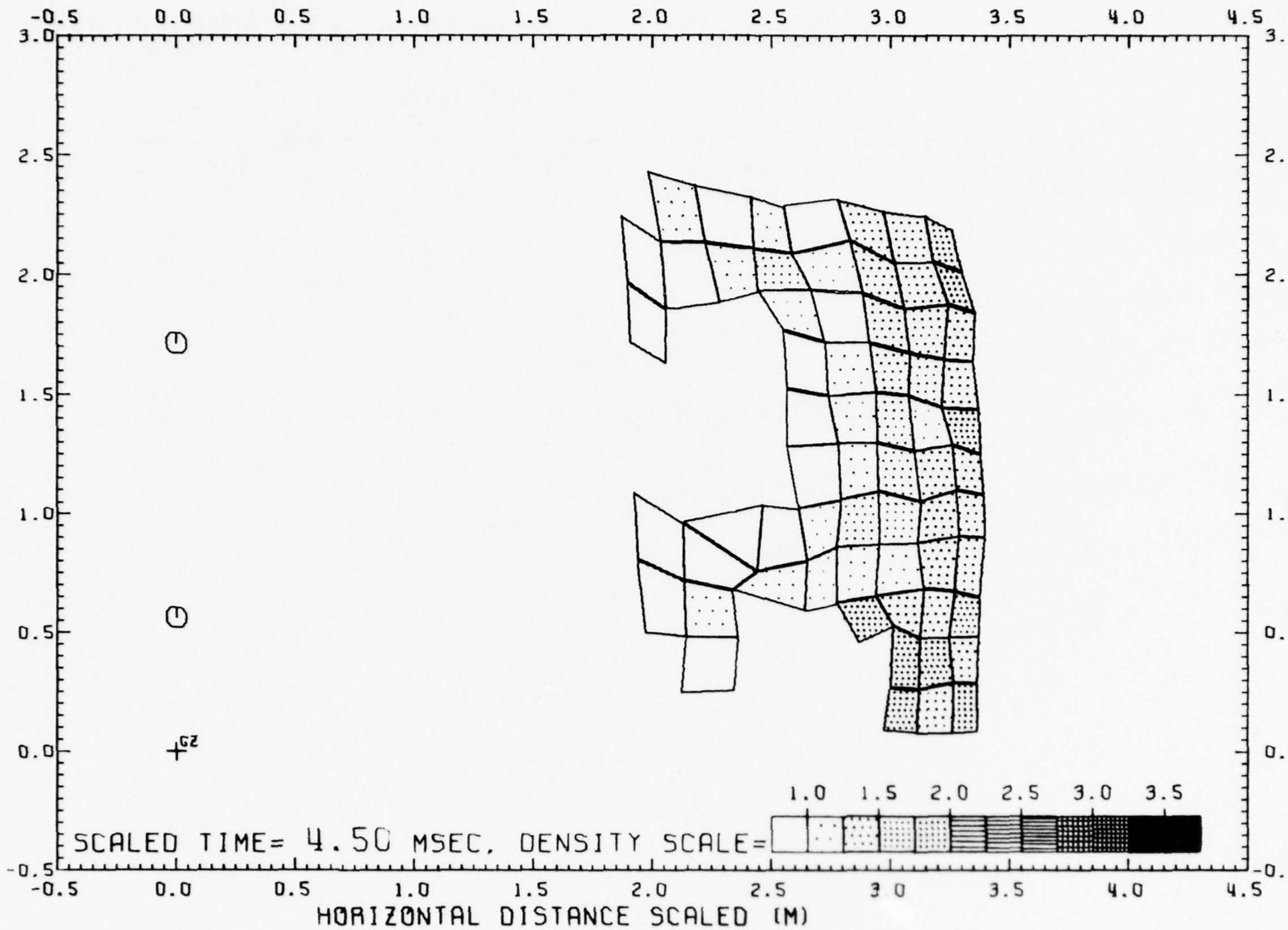


Fig. 13.19 DENSITY FIELD, DIPOLE WEST/10

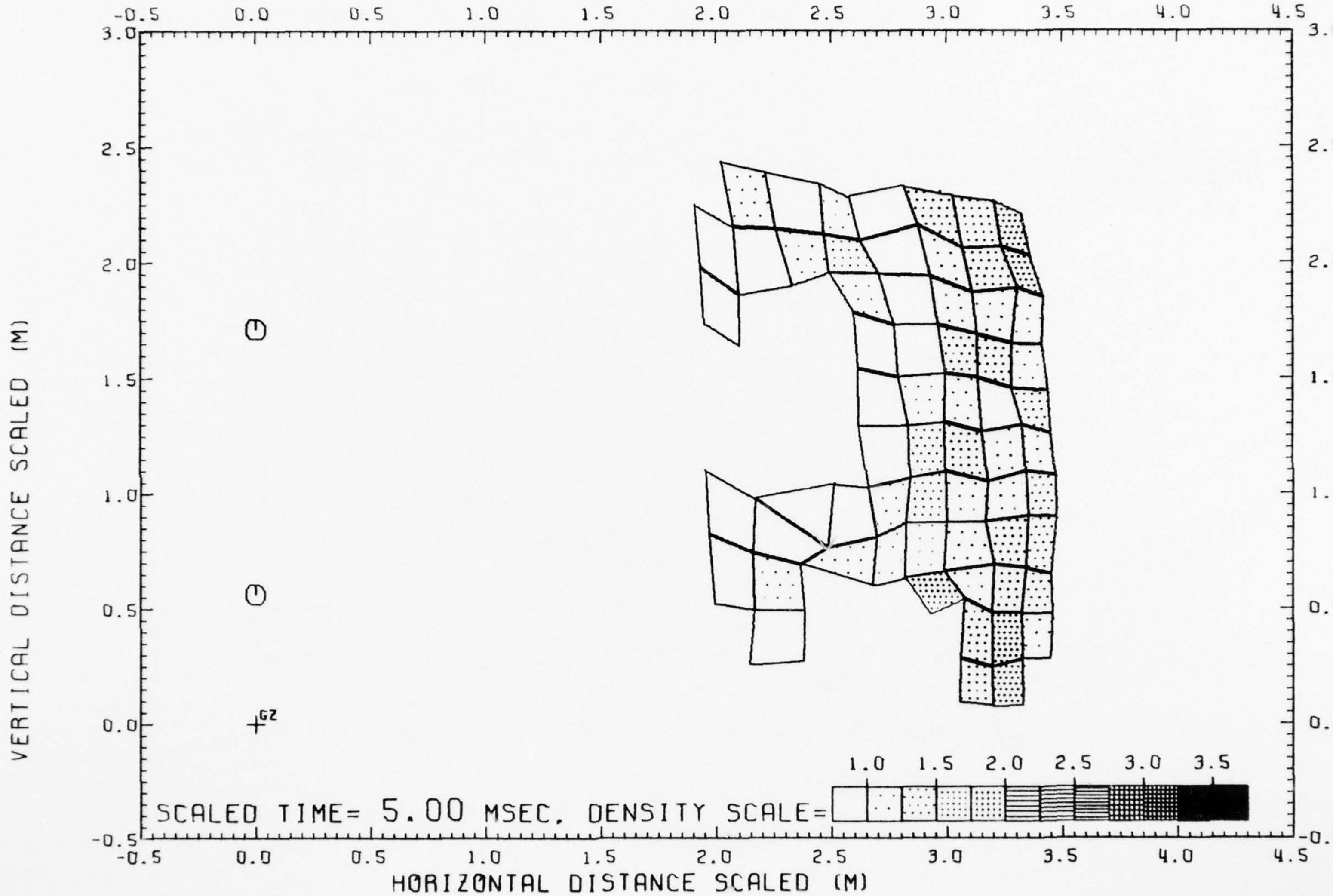


Fig. 13.20 DENSITY FIELD, DIPOLE WEST/10

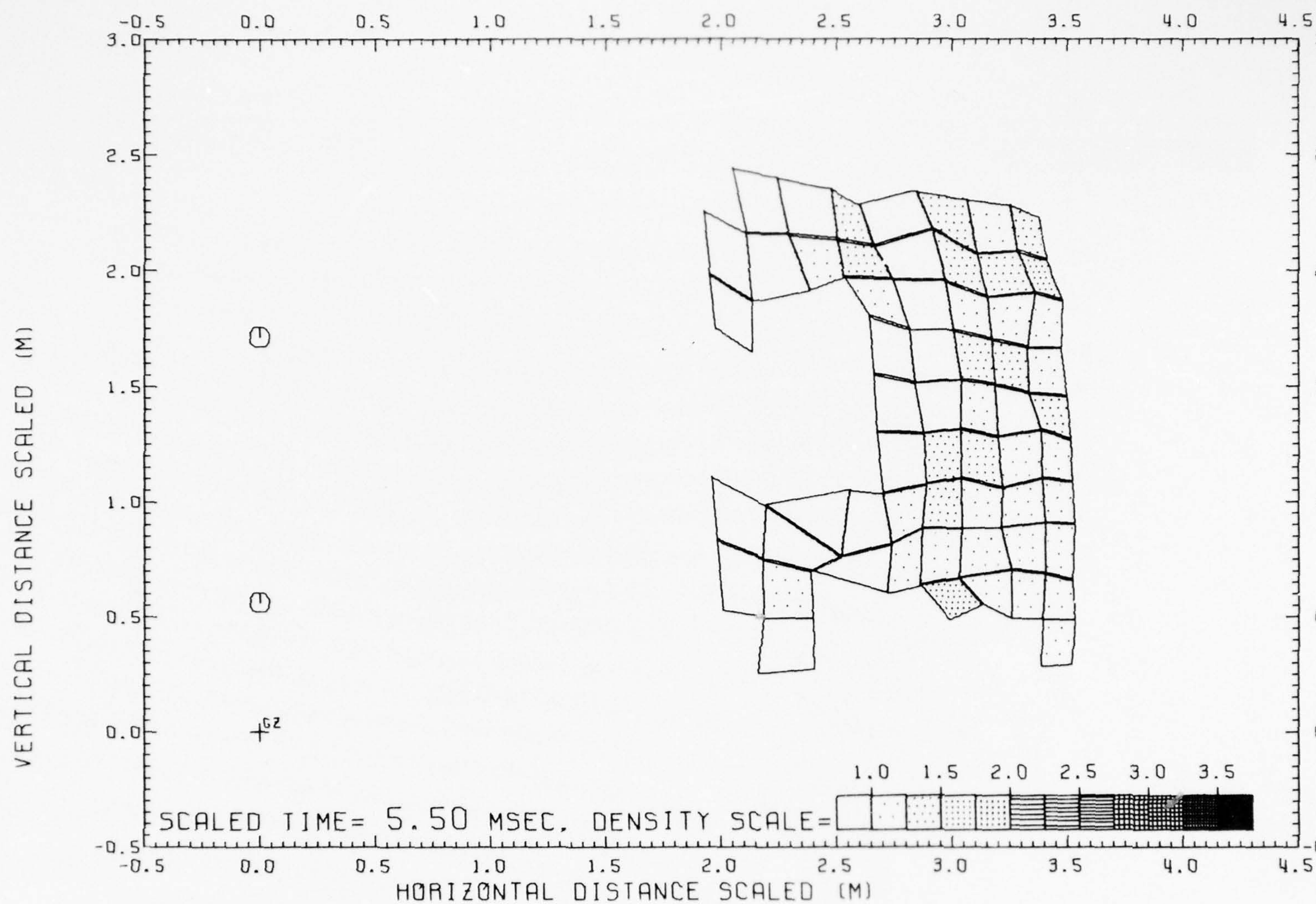


Fig. 13.21 DENSITY FIELD, DIPOLE WEST/10

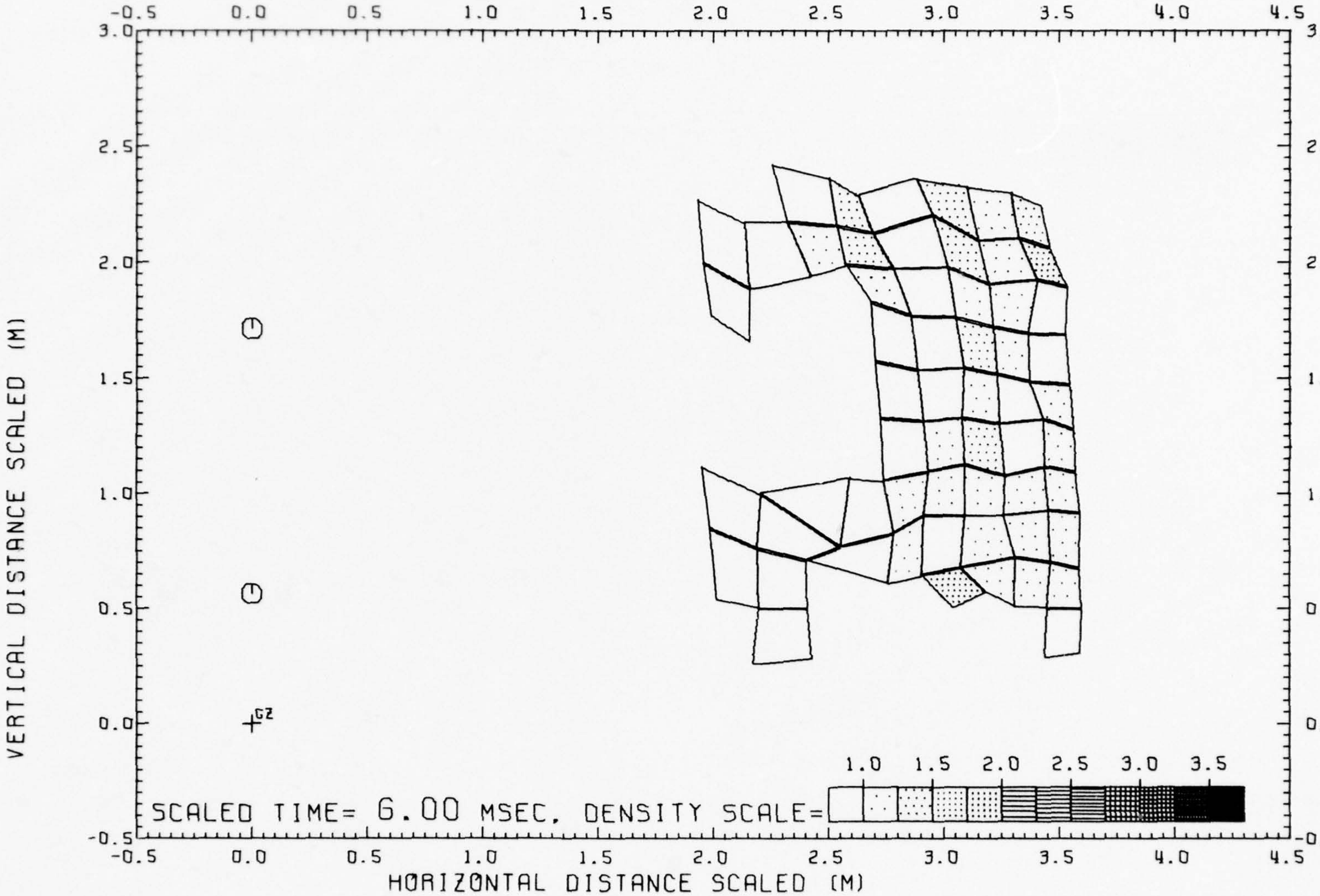


Fig. 13.22 DENSITY FIELD, DIPOLE WEST/10

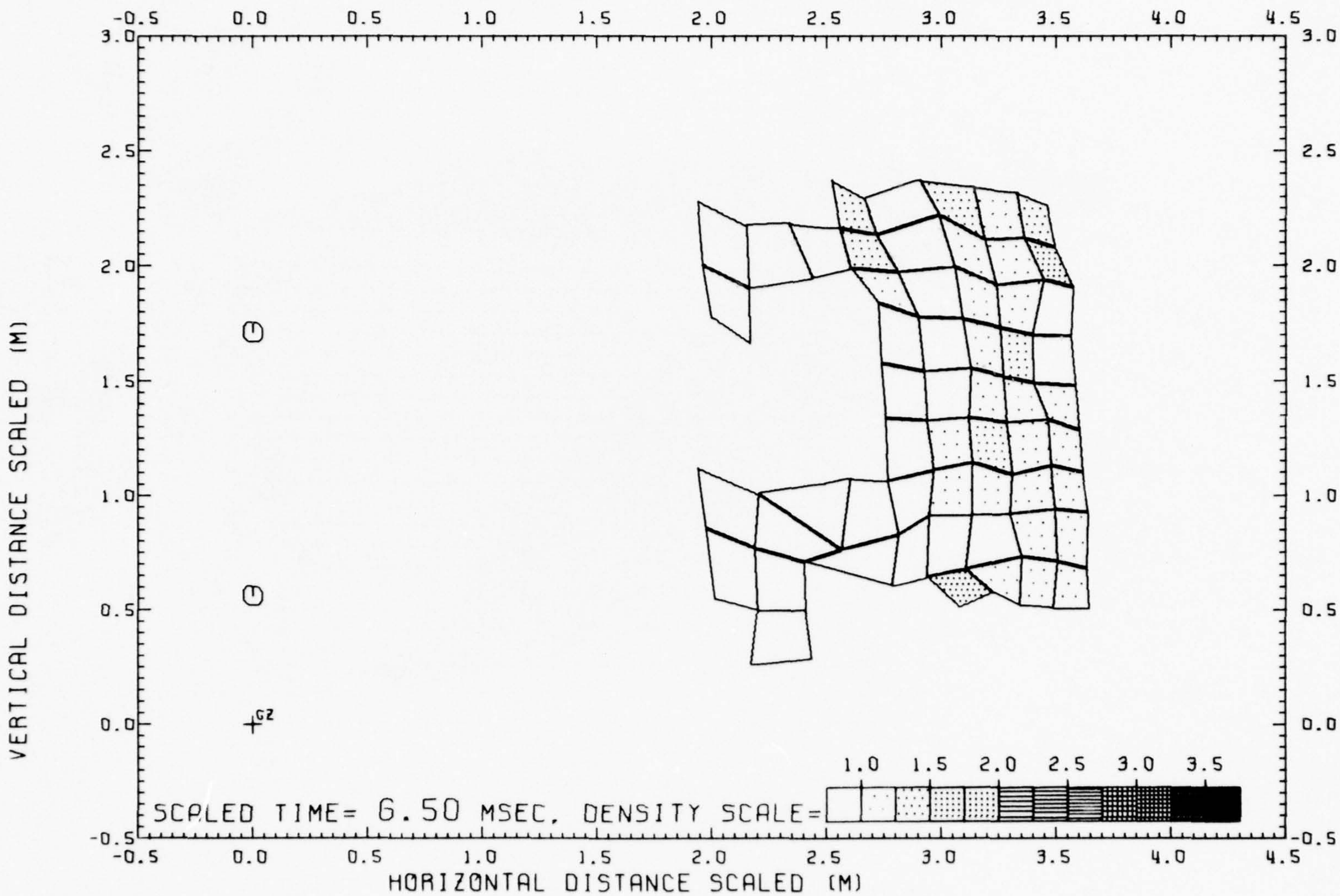


Fig. 13.23 DENSITY FIELD, DIPOLE WEST/10

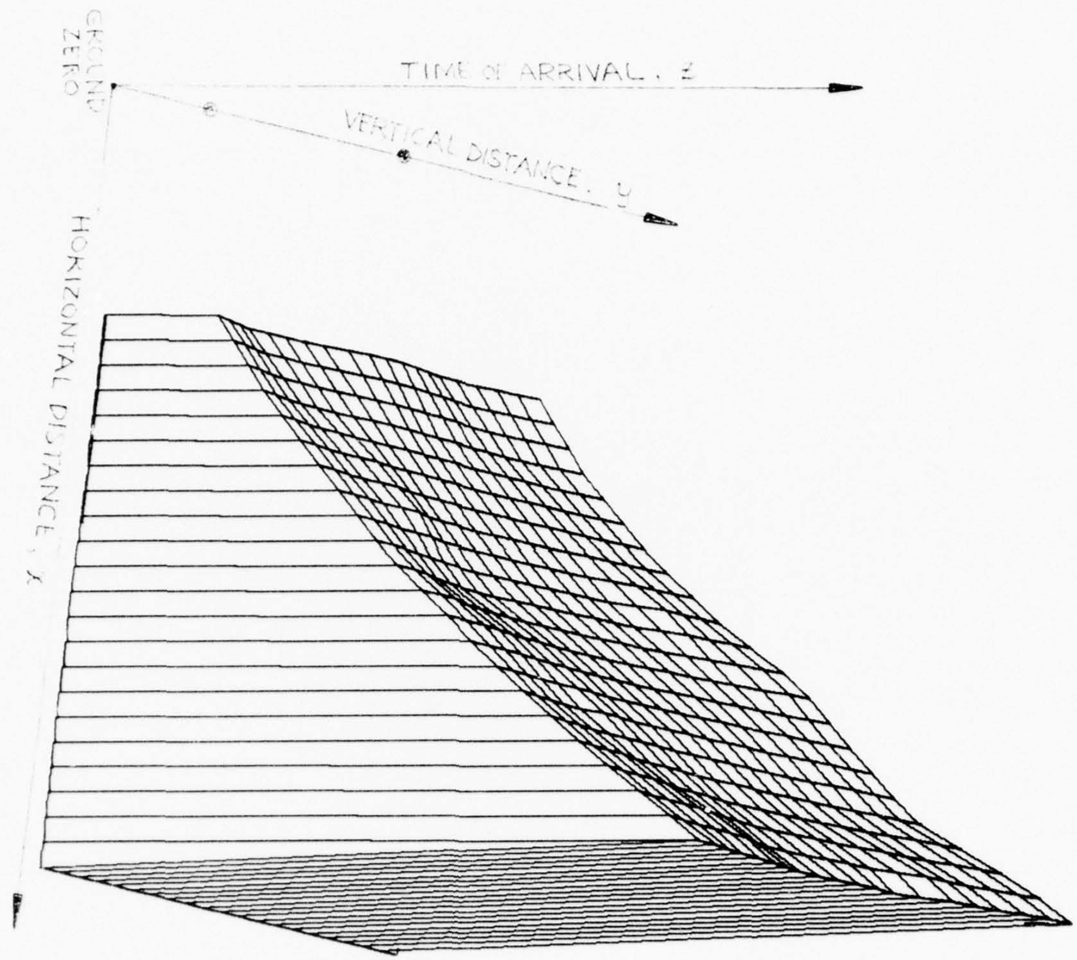


Fig. 14 Time-of-arrival surface, Dipole West/10

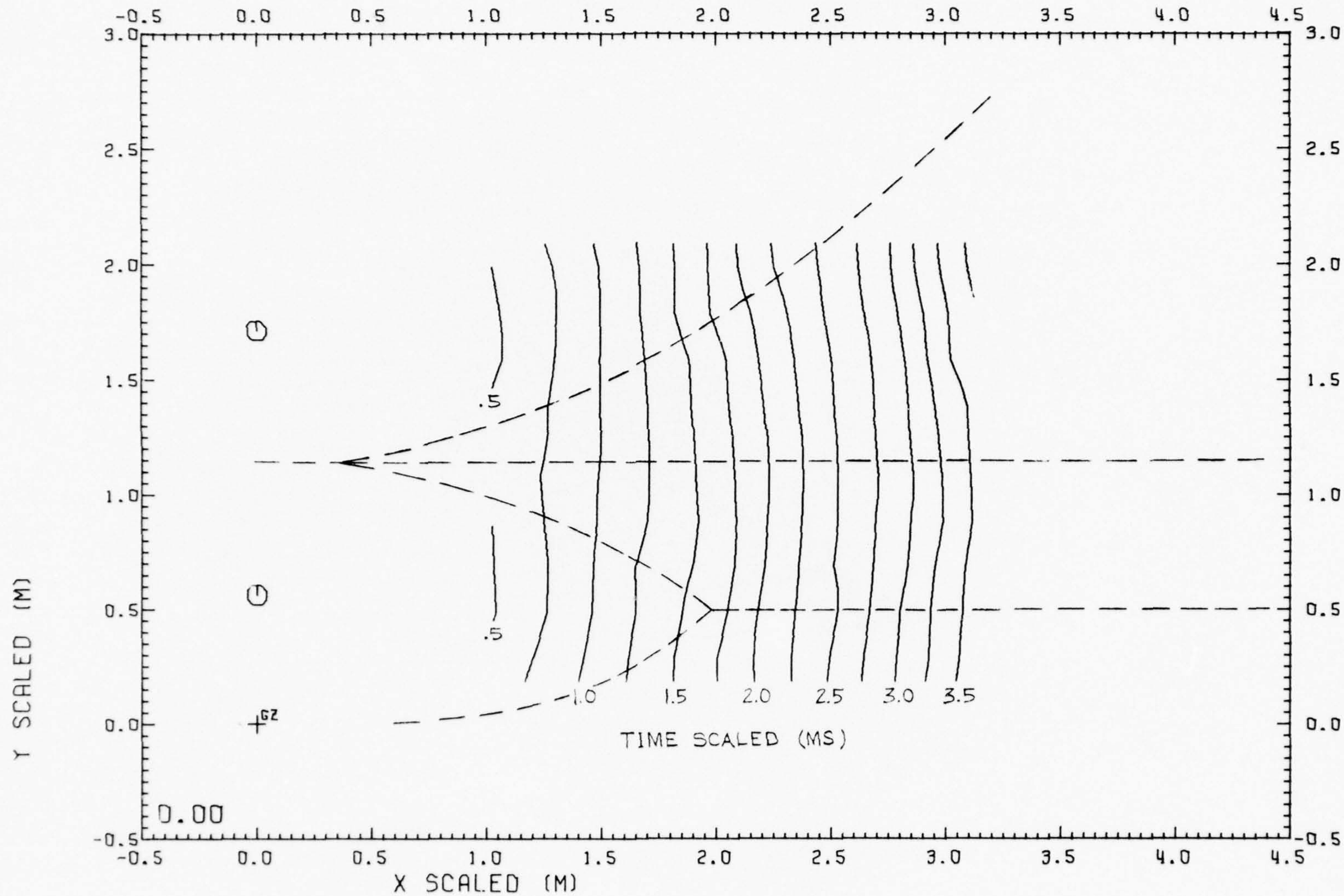


Fig. 15 SHOCK FRONT SHAPES, DIPOLE WEST/10

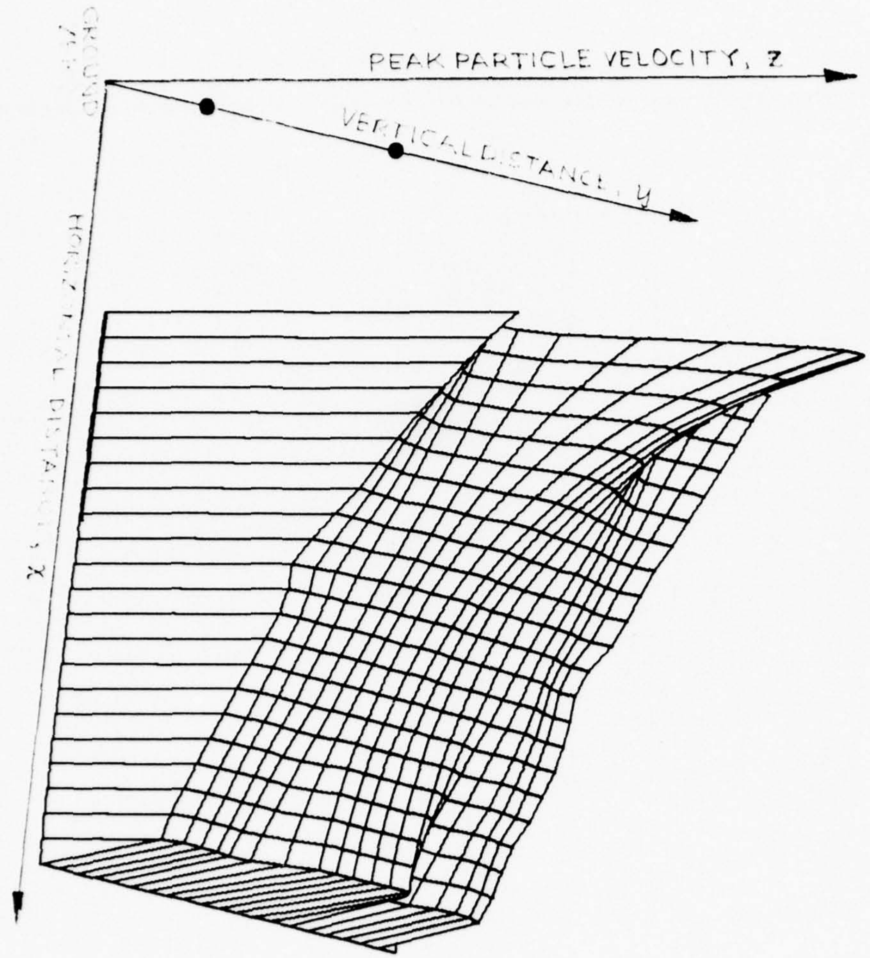


Fig. 16   A shock strength surface, Dipole West/10

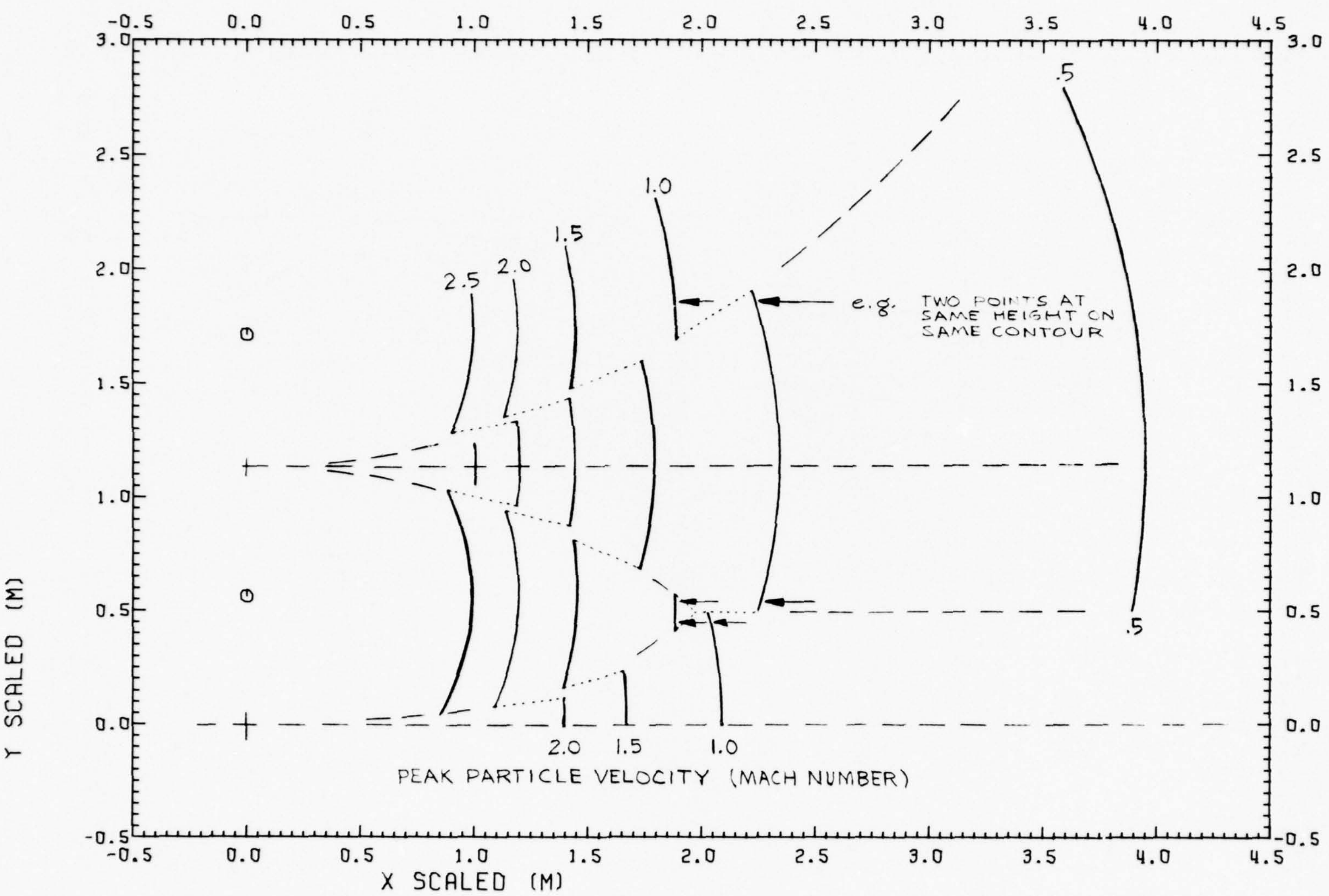


Fig. 17 SHOCK STRENGTH CONTOURS, DIPOLE WEST/10

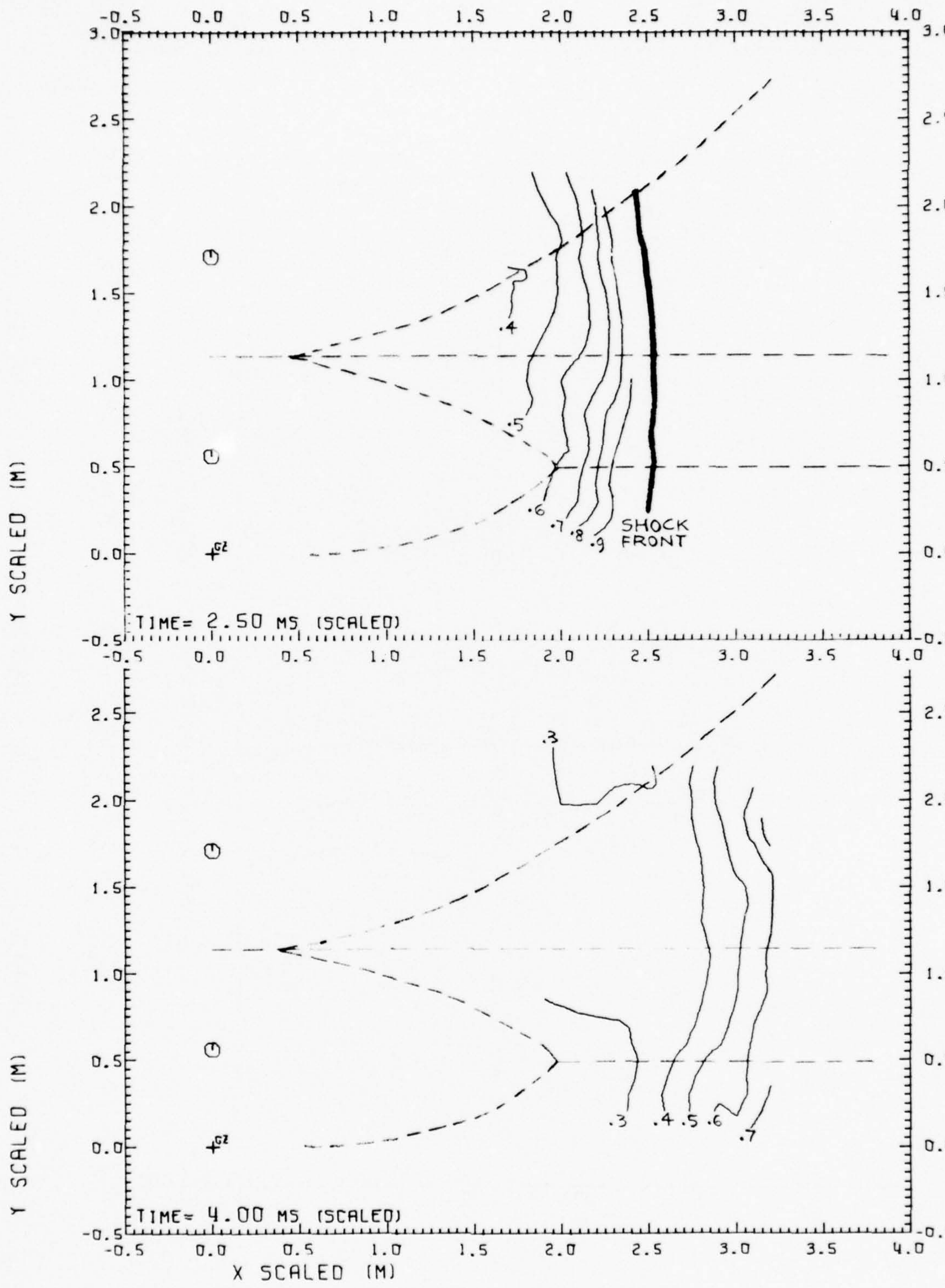


Fig. 18 DIPOLE WEST/10 PARTICLE VELOCITY

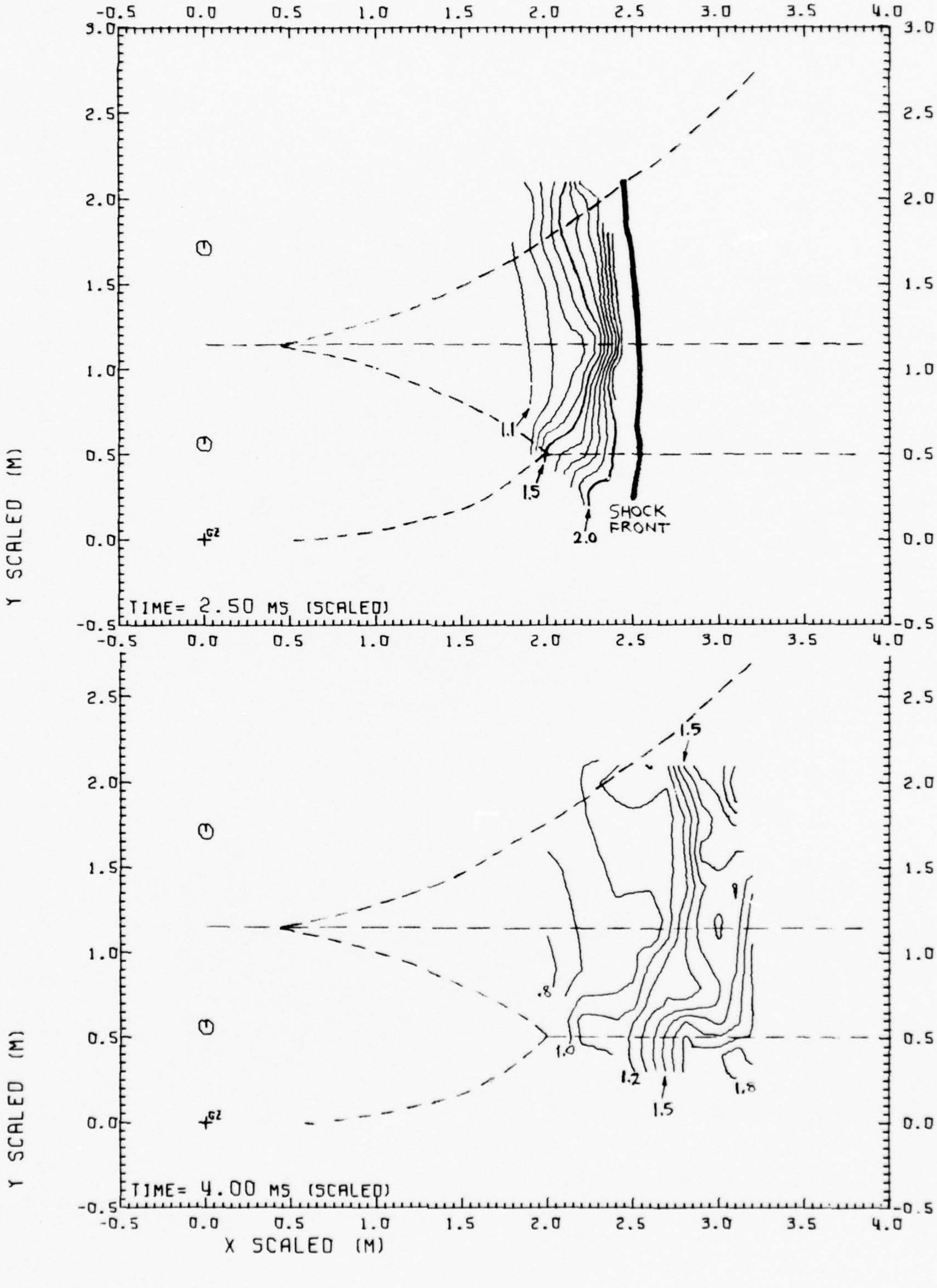


Fig. 19 DIPOLE WEST/10 DENSITY

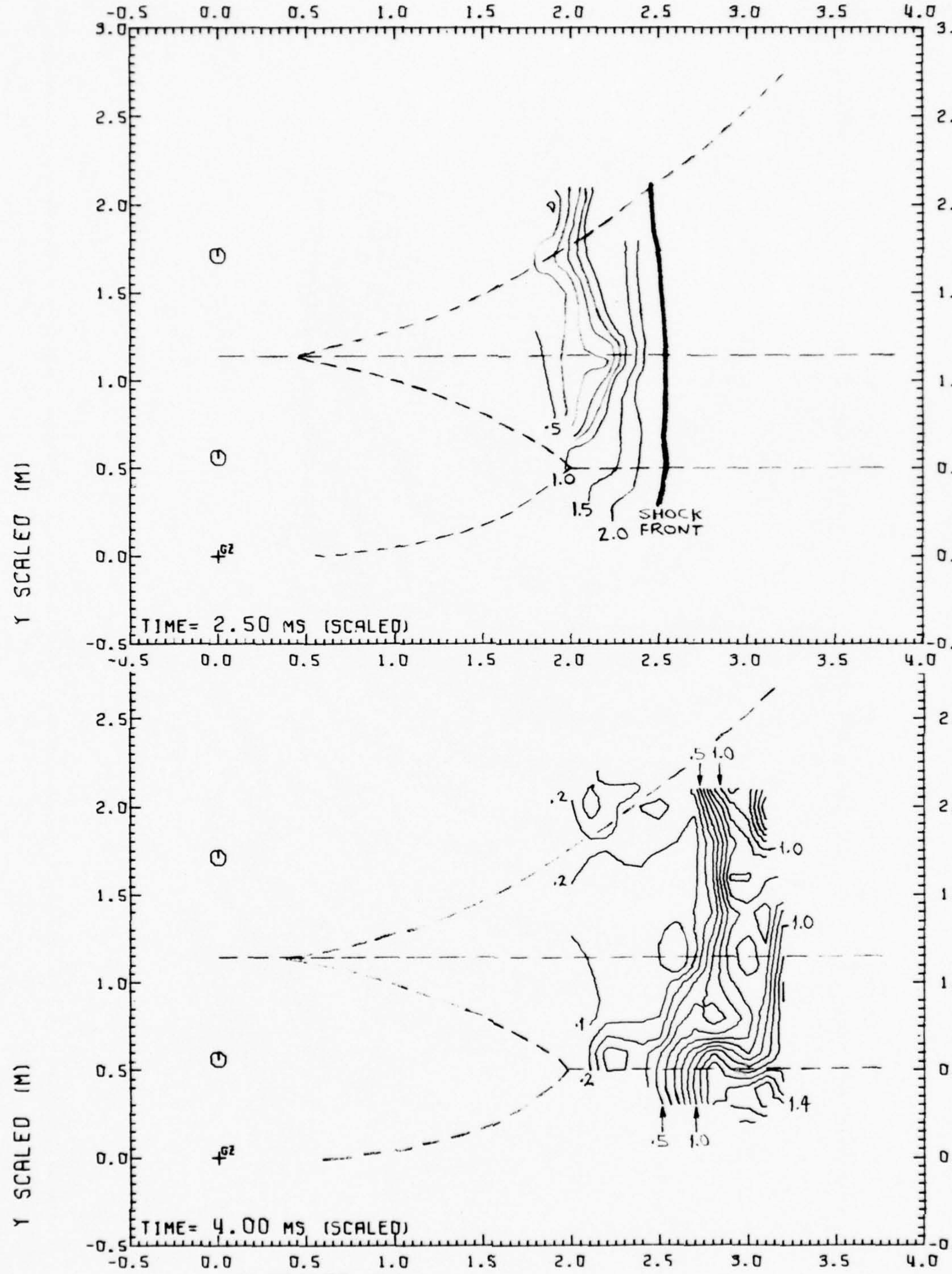


Fig. 20 DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

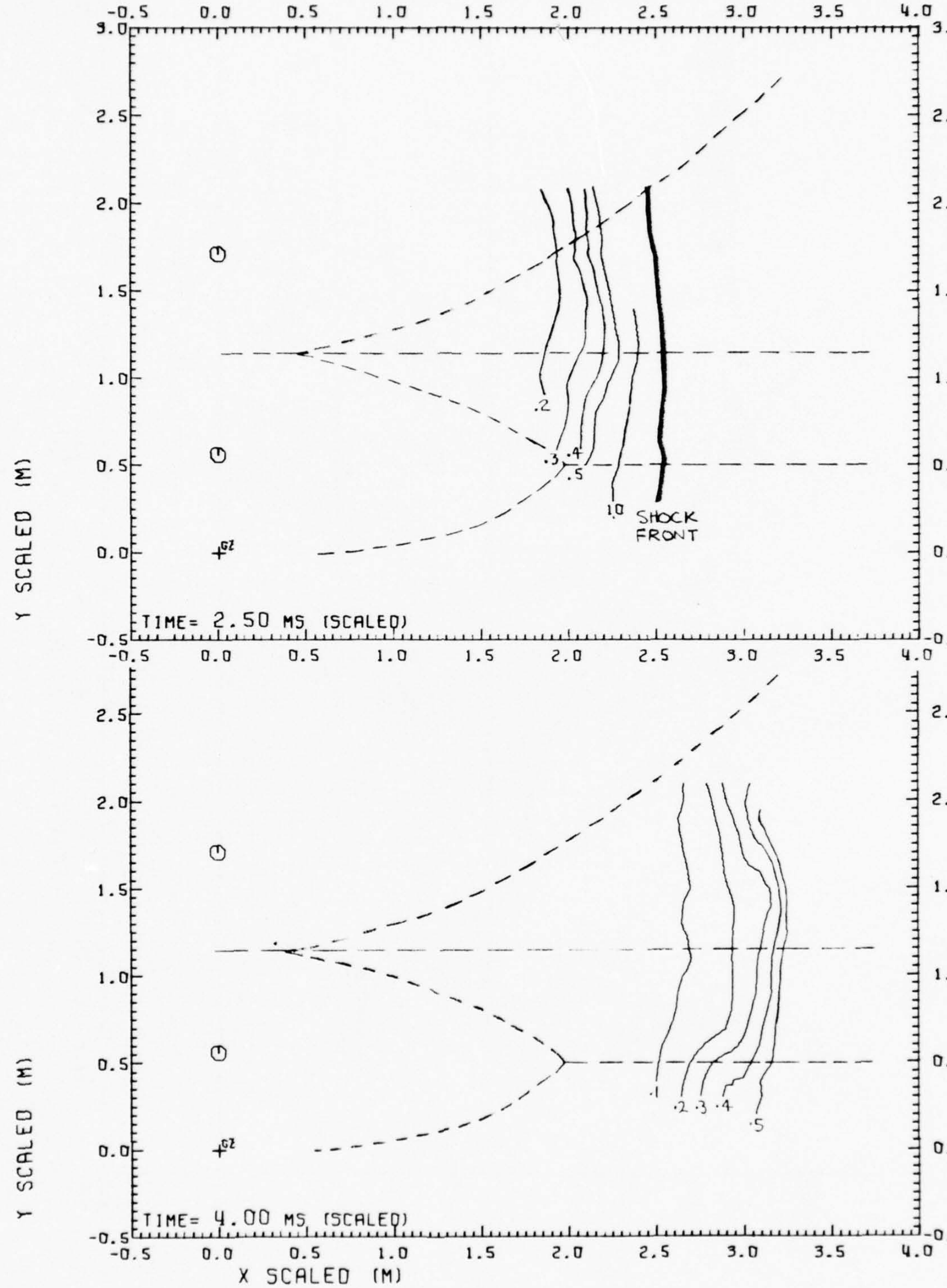


Fig. 21 DIPOLE WEST/10 DYNAMIC PRESSURE

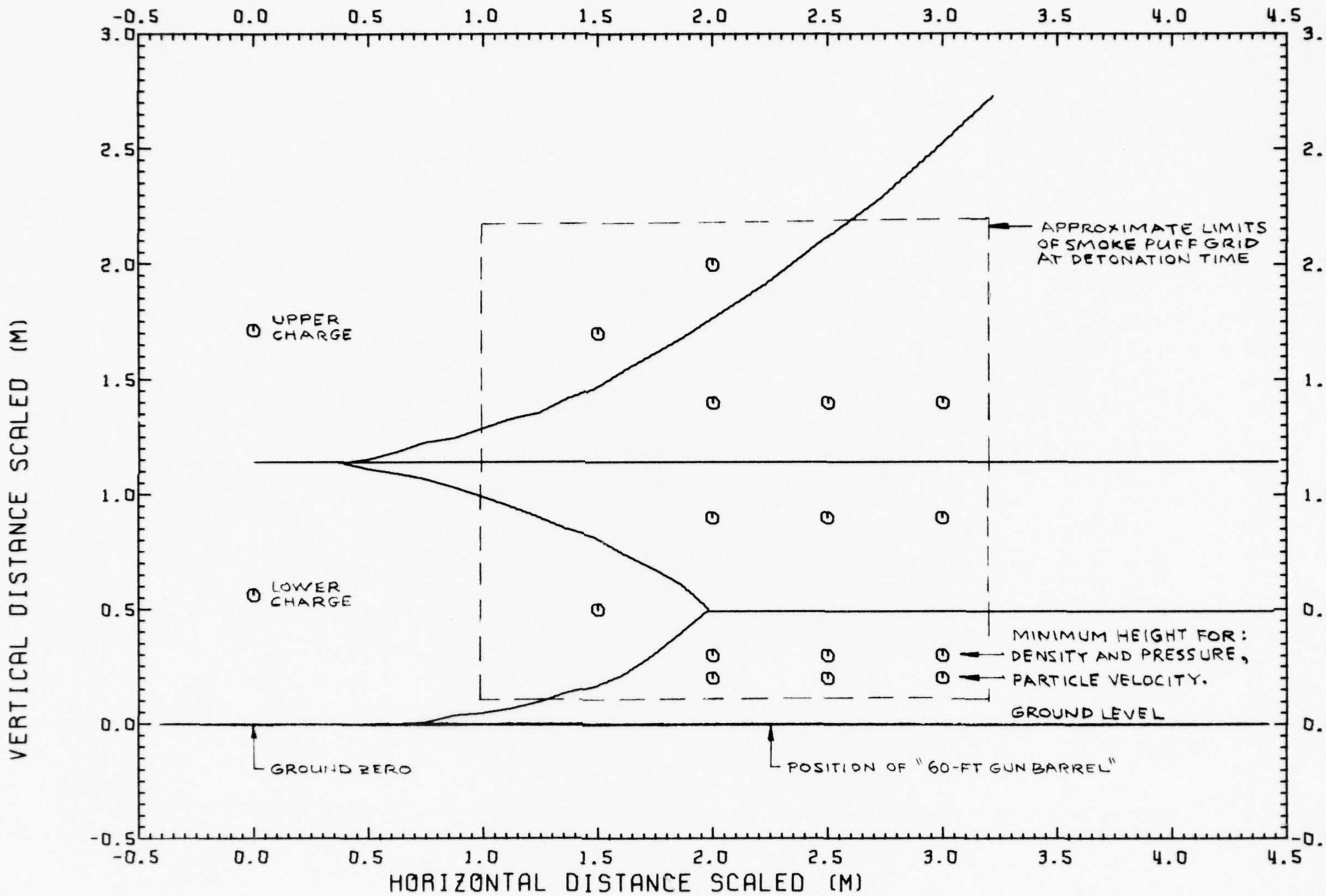


Fig. 22 TIME HISTORY STATIONS, DIPOLE WEST/10

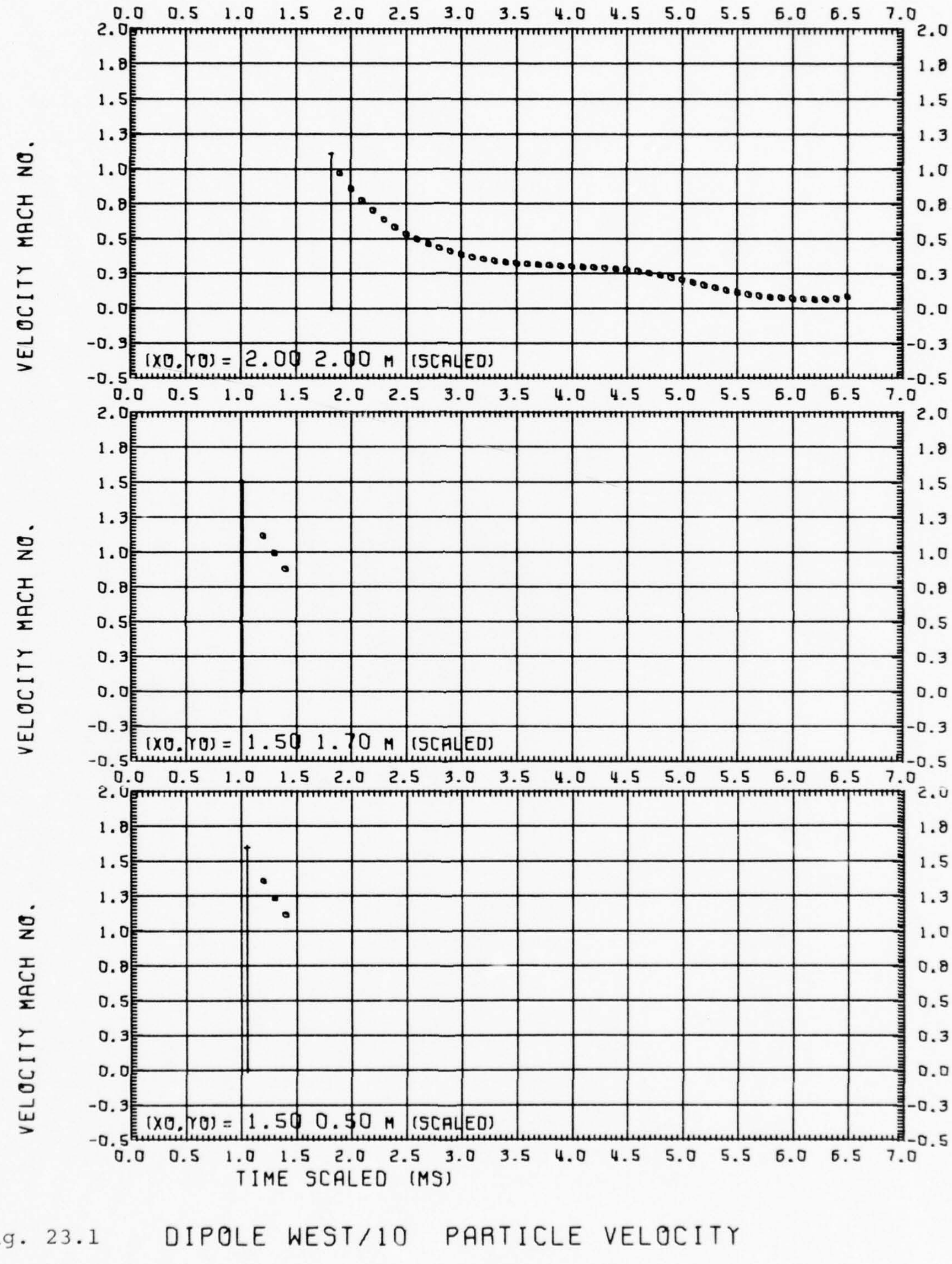


Fig. 23.1 DIPOLE WEST/10 PARTICLE VELOCITY

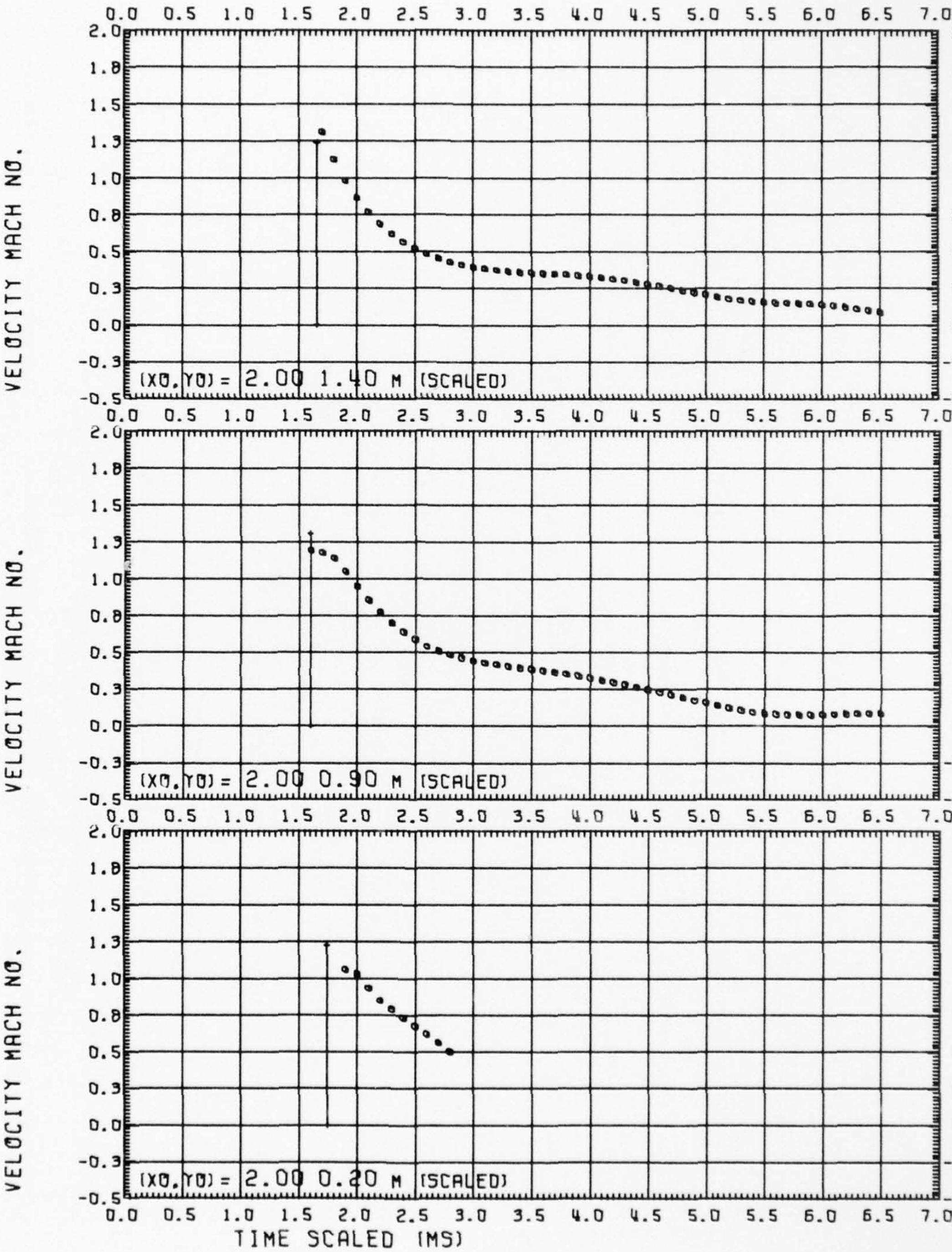


Fig. 23.2 DIPOLE WEST/10 PARTICLE VELOCITY

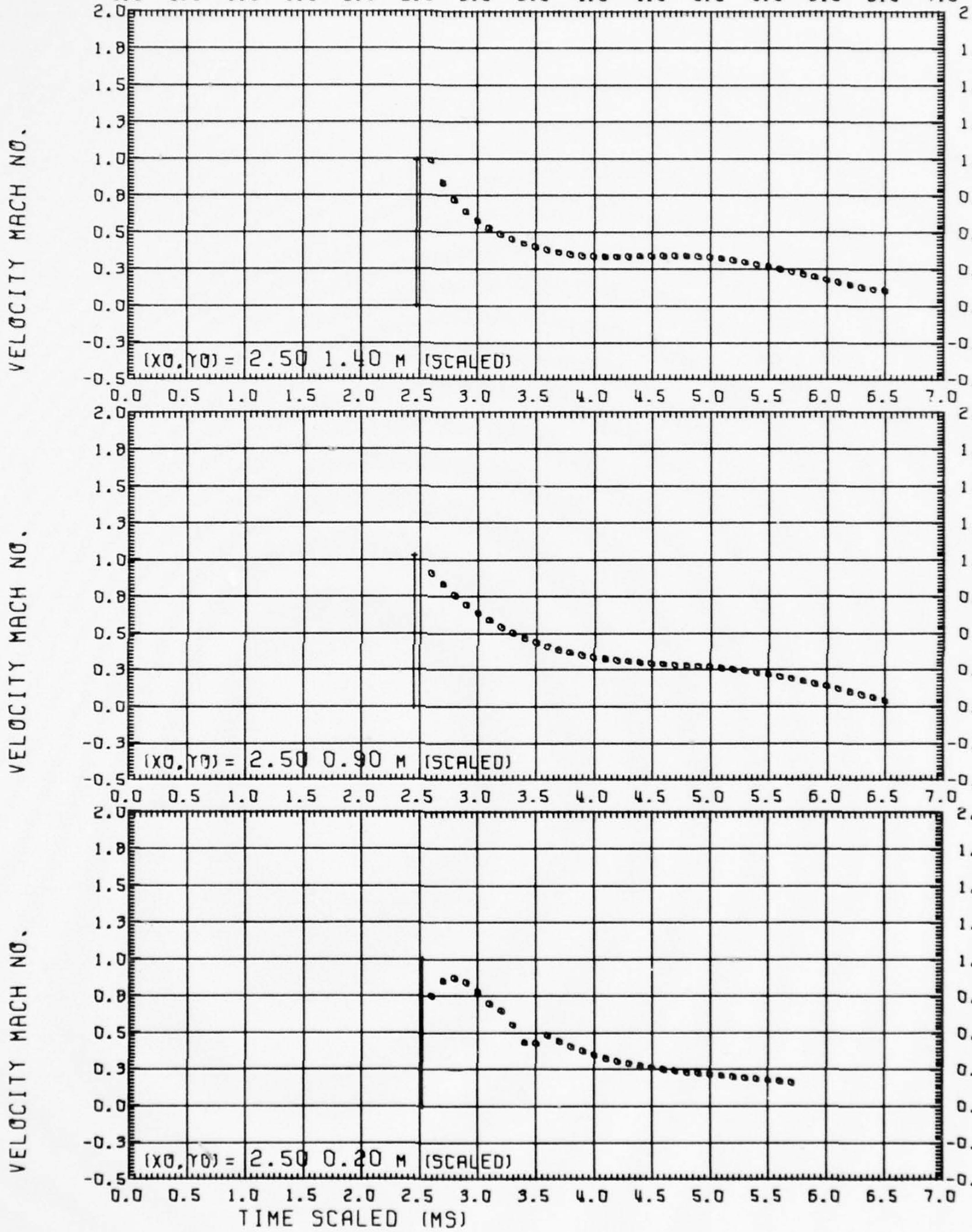


Fig. 23.3 DIPOLE WEST/10 PARTICLE VELOCITY

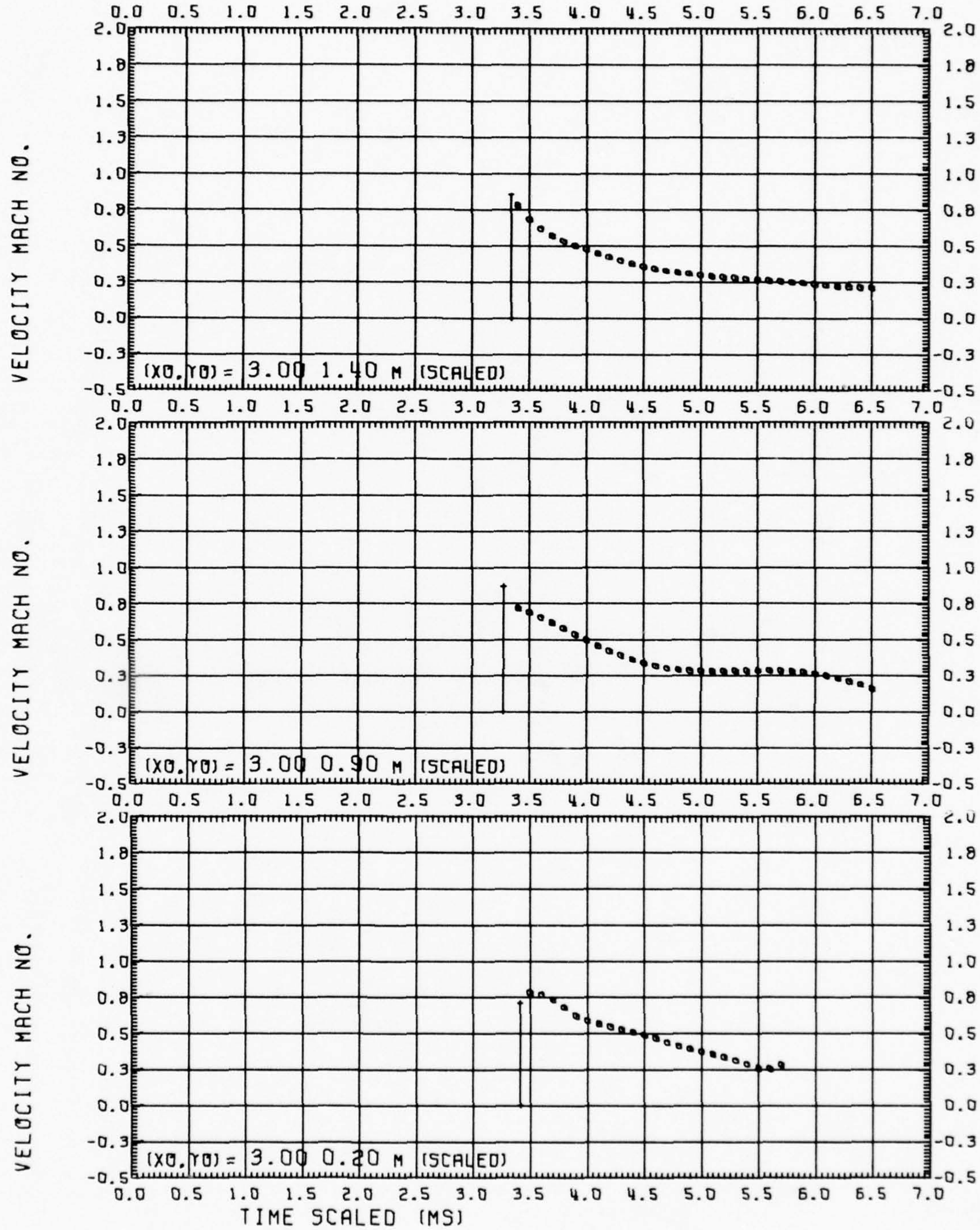


Fig. 23.4 DIPOLE WEST/10 PARTICLE VELOCITY

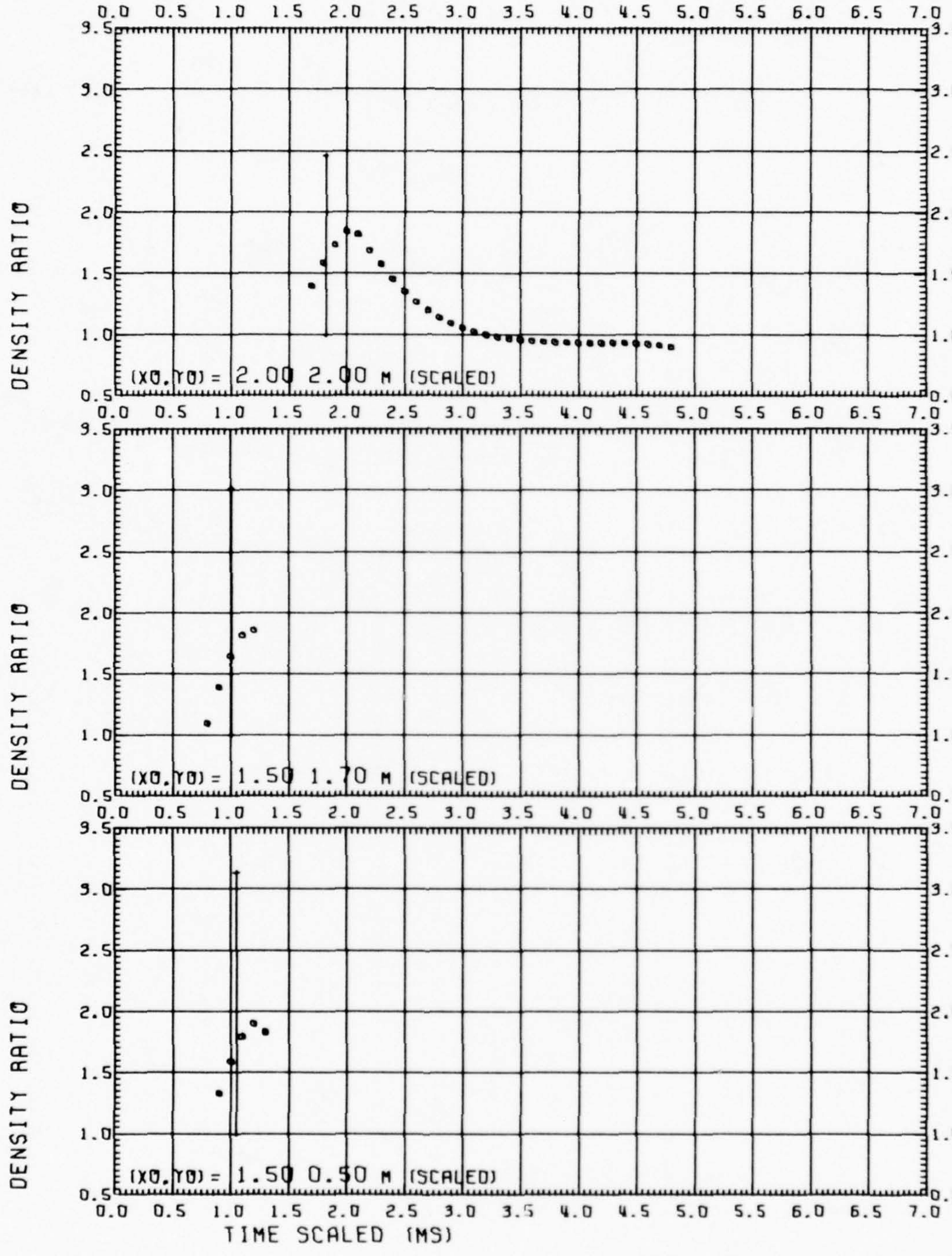


Fig. 24.1 DIPOLE WEST/10 DENSITY

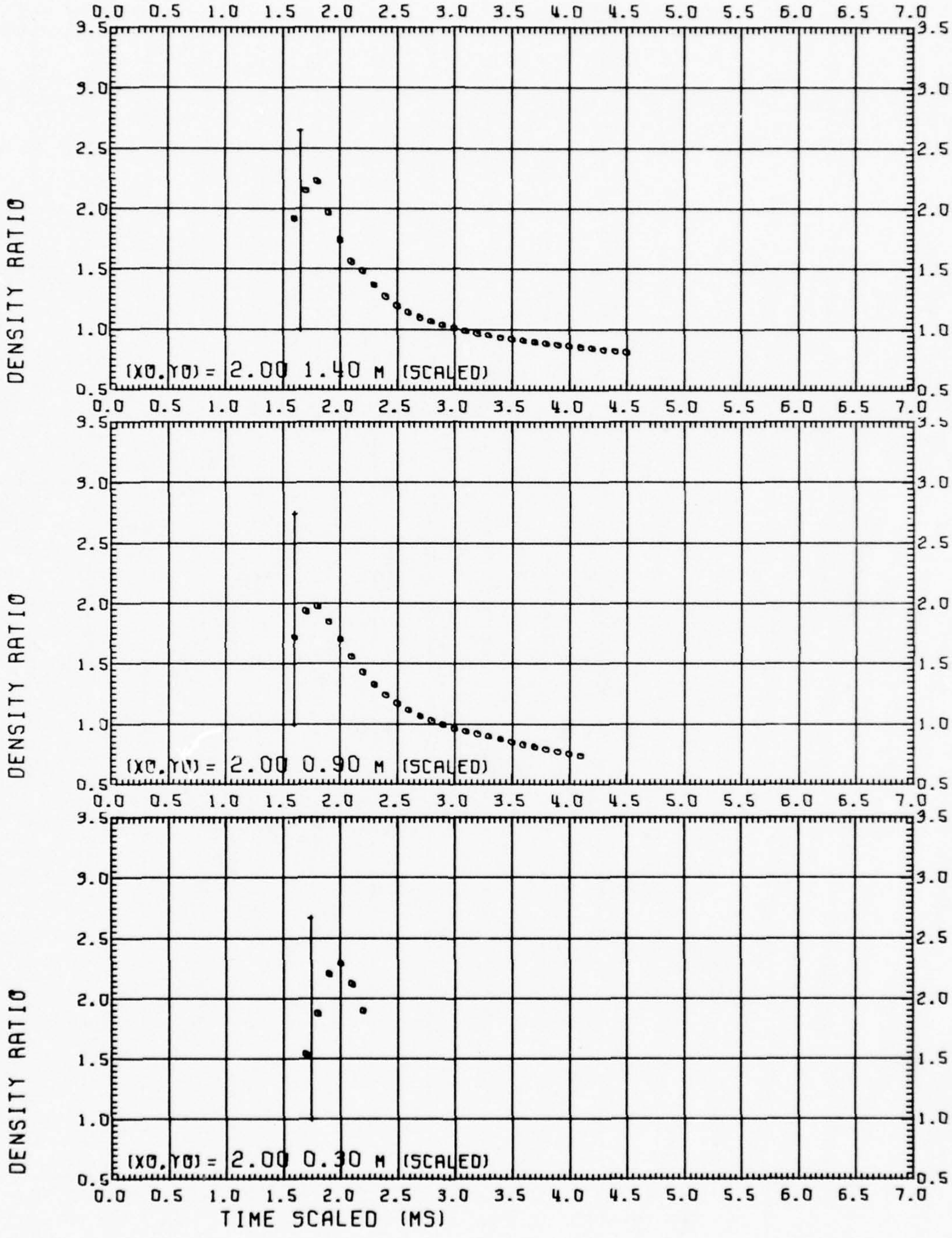


Fig. 24.2 DIPOLE WEST/10 DENSITY

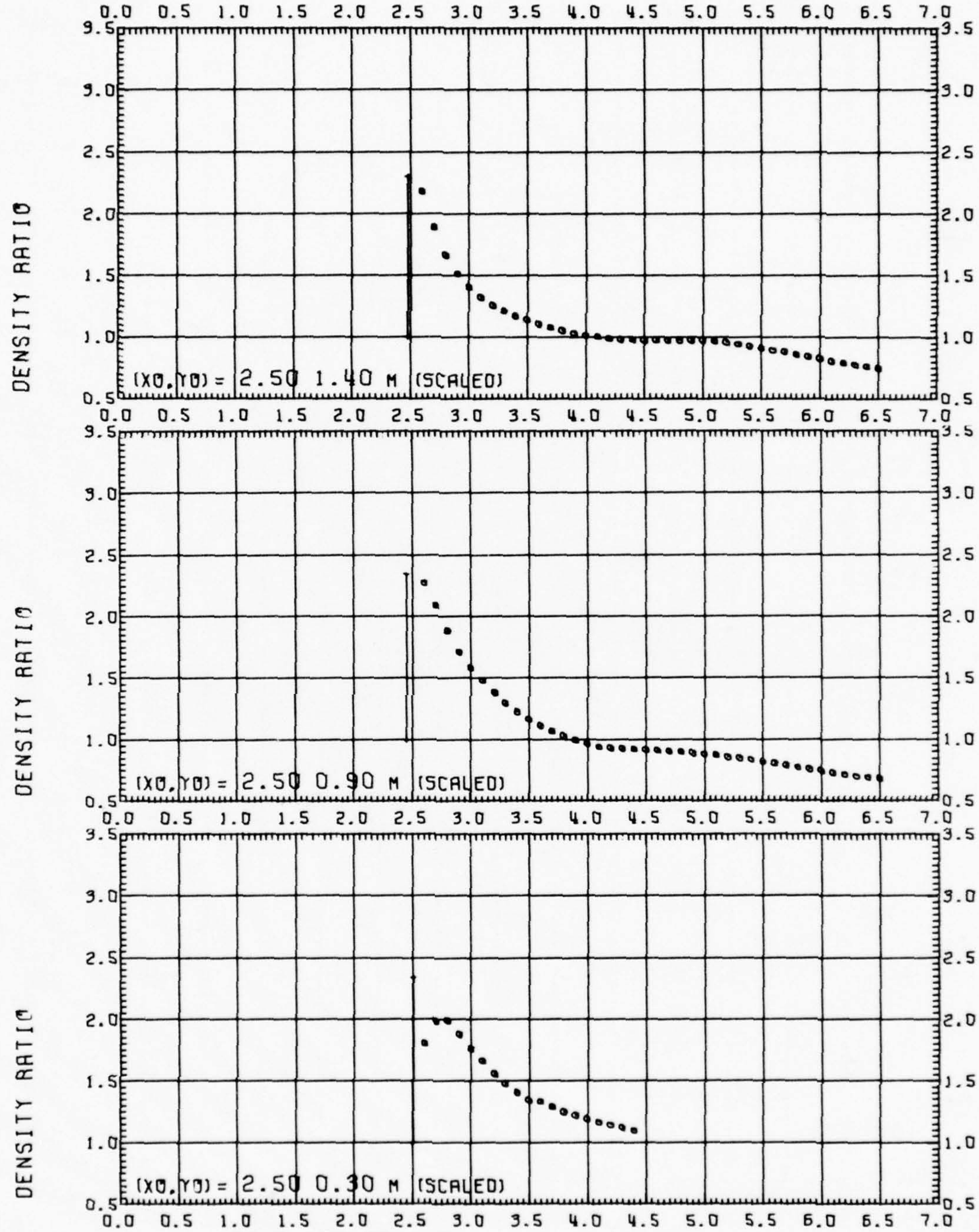


Fig. 24.3 DIPOLE WEST/10 DENSITY

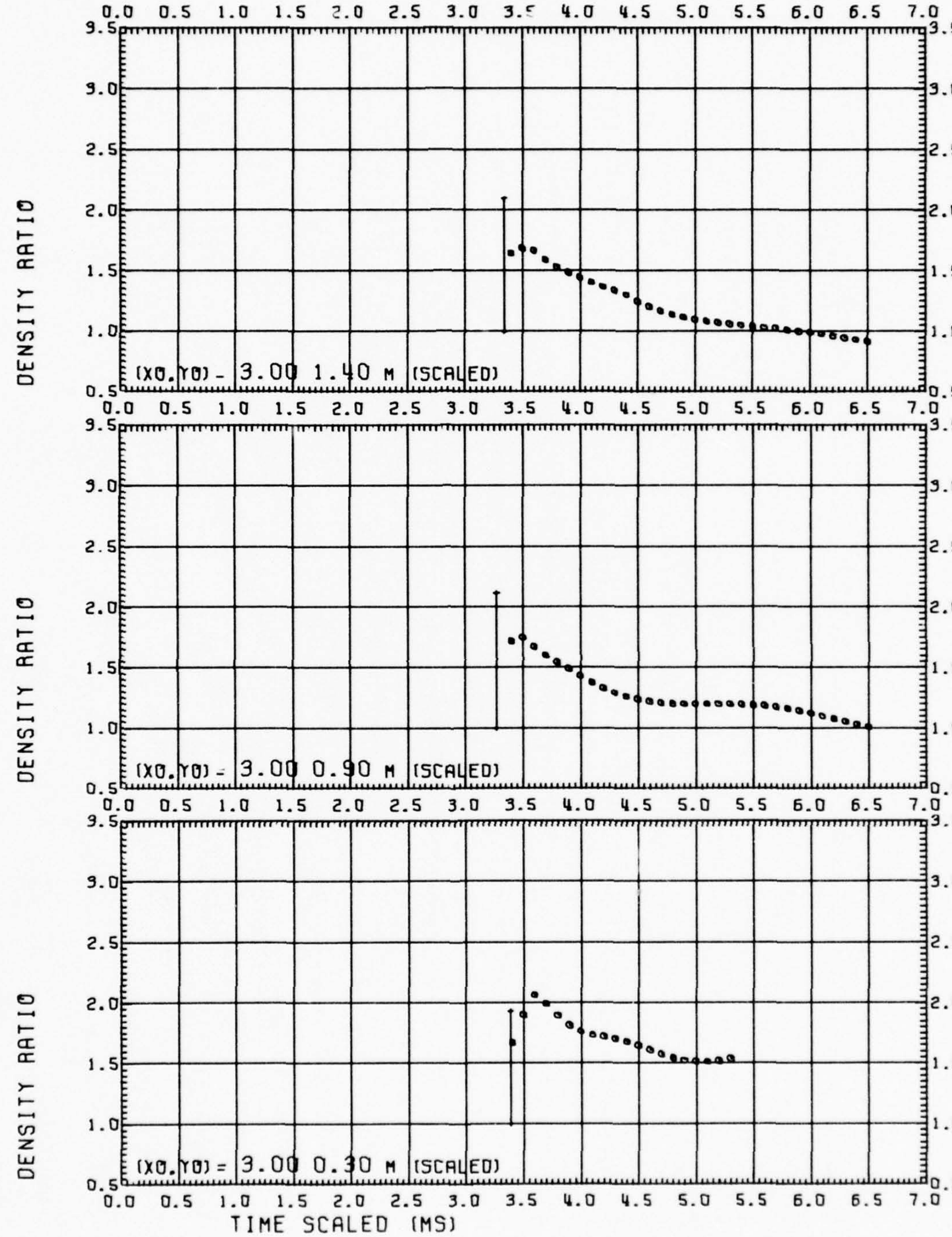


Fig. 24.4 DIPOLE WEST/10 DENSITY

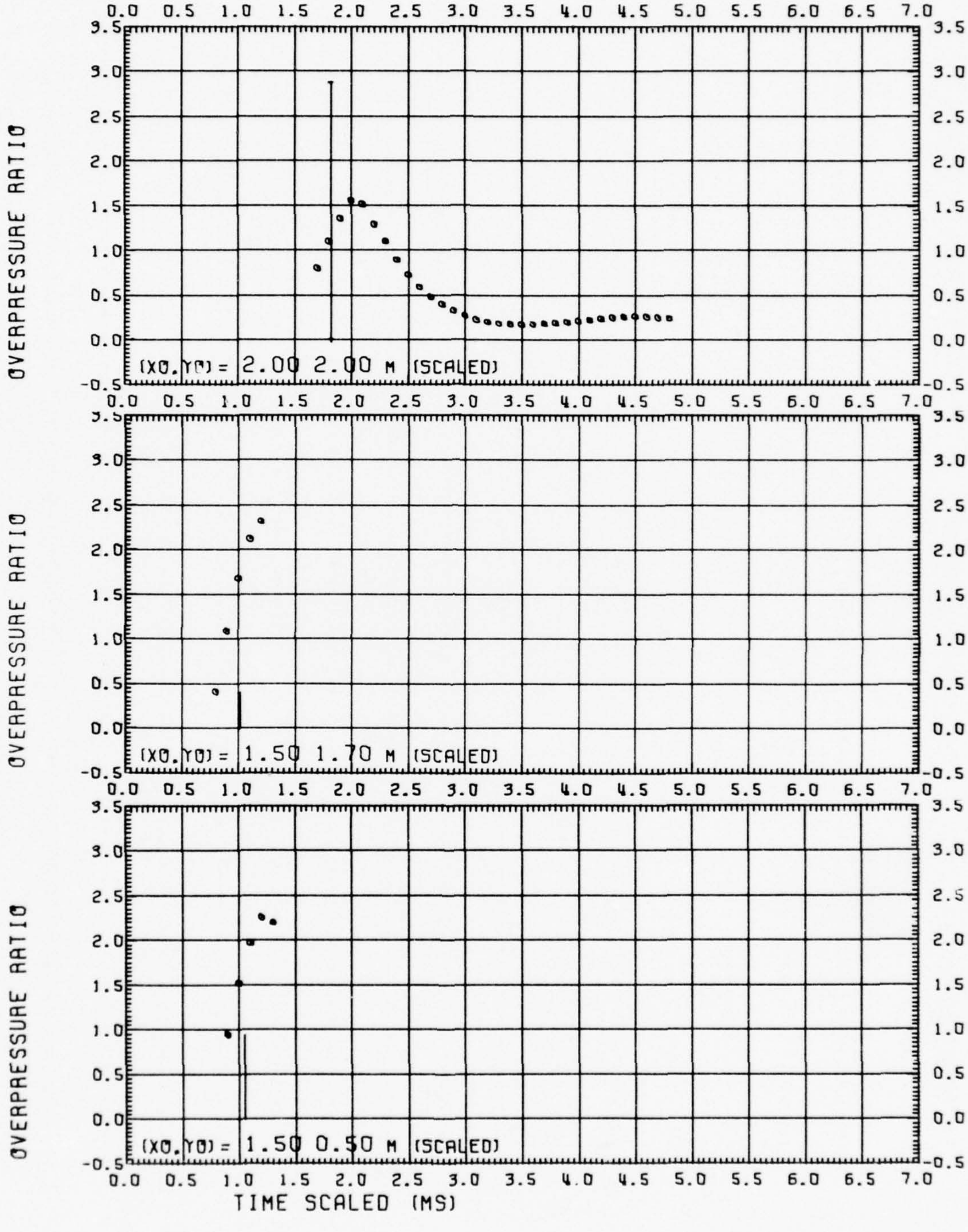


Fig. 25.1 DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

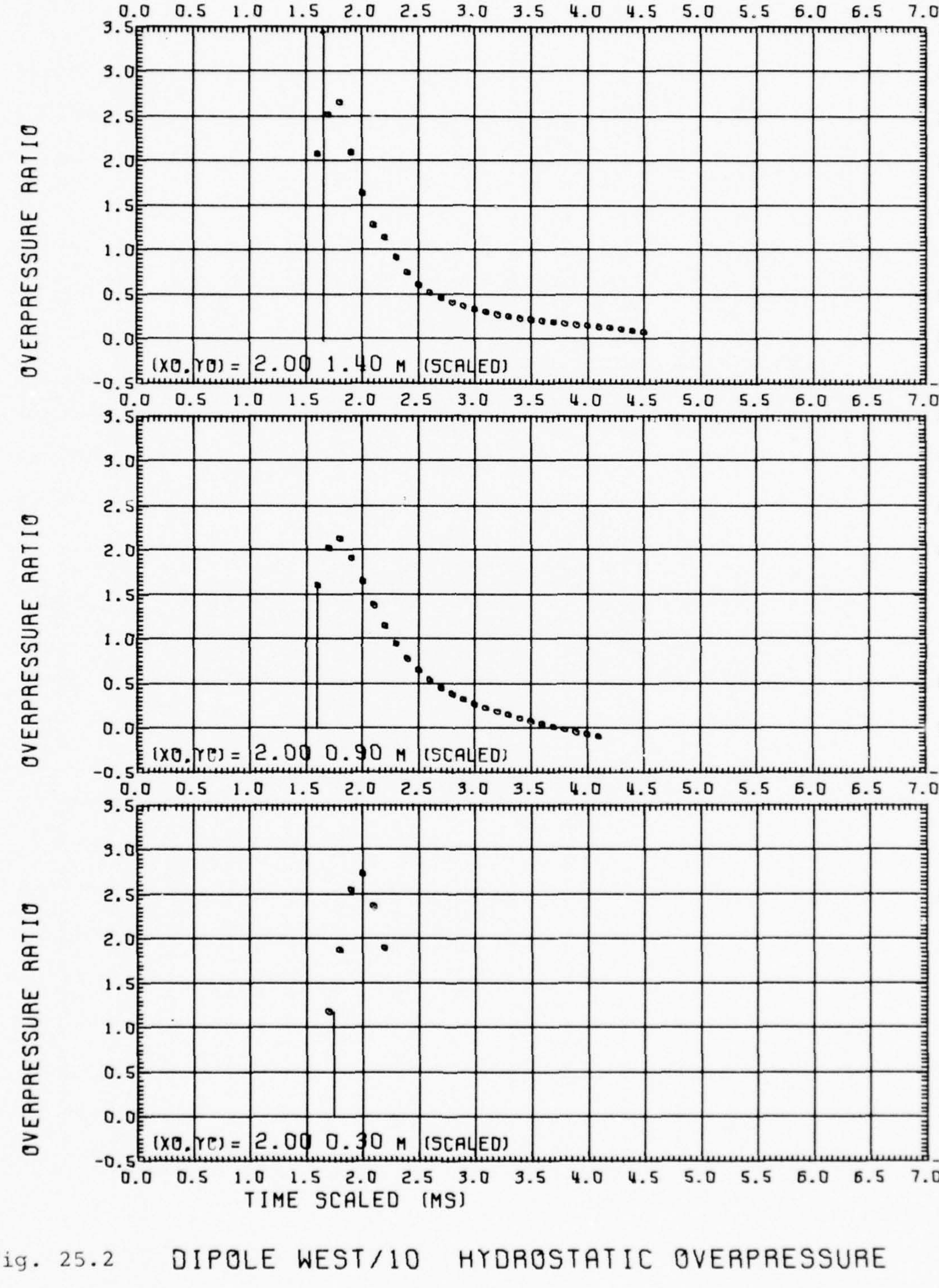


Fig. 25.2 DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

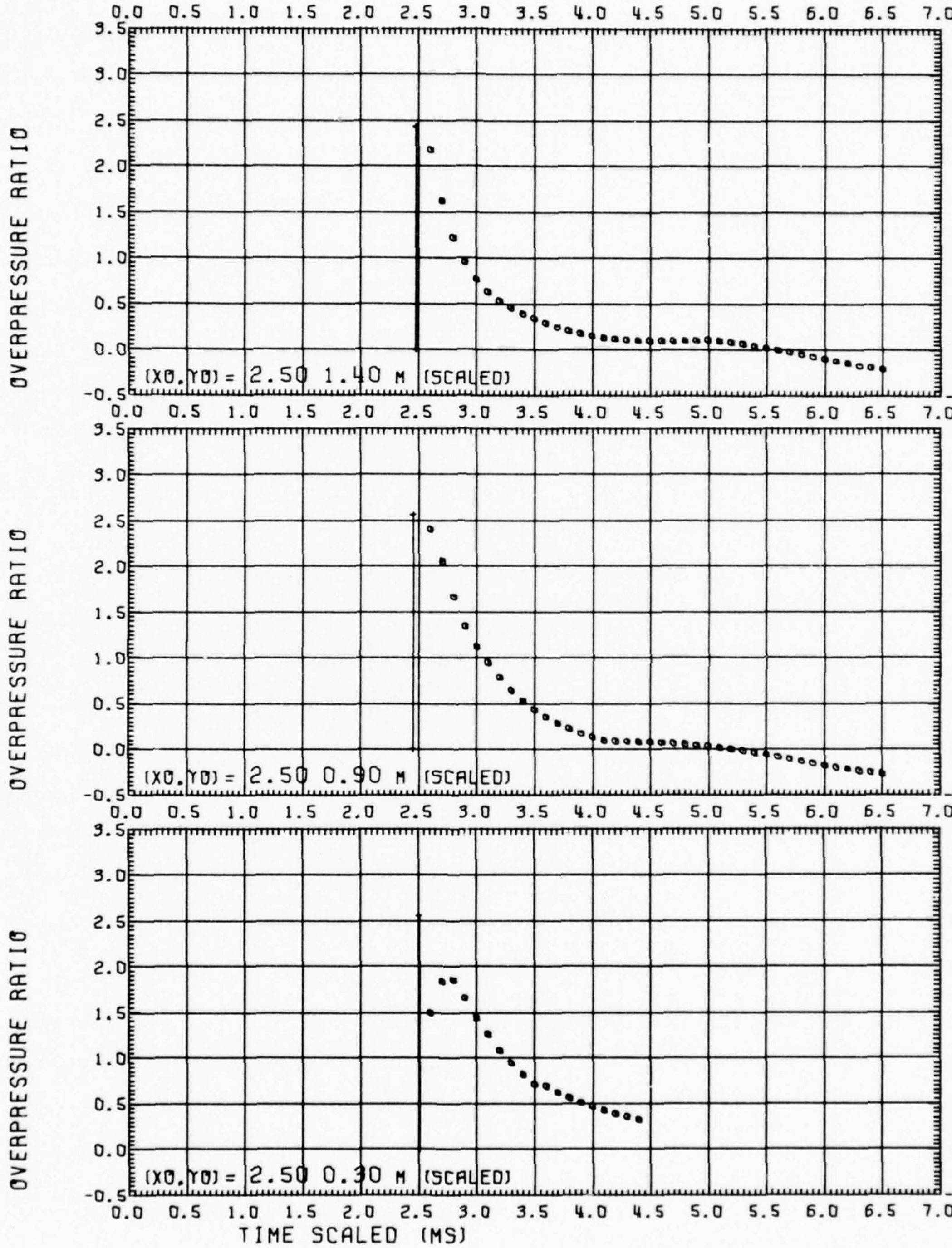


Fig. 25.3 DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

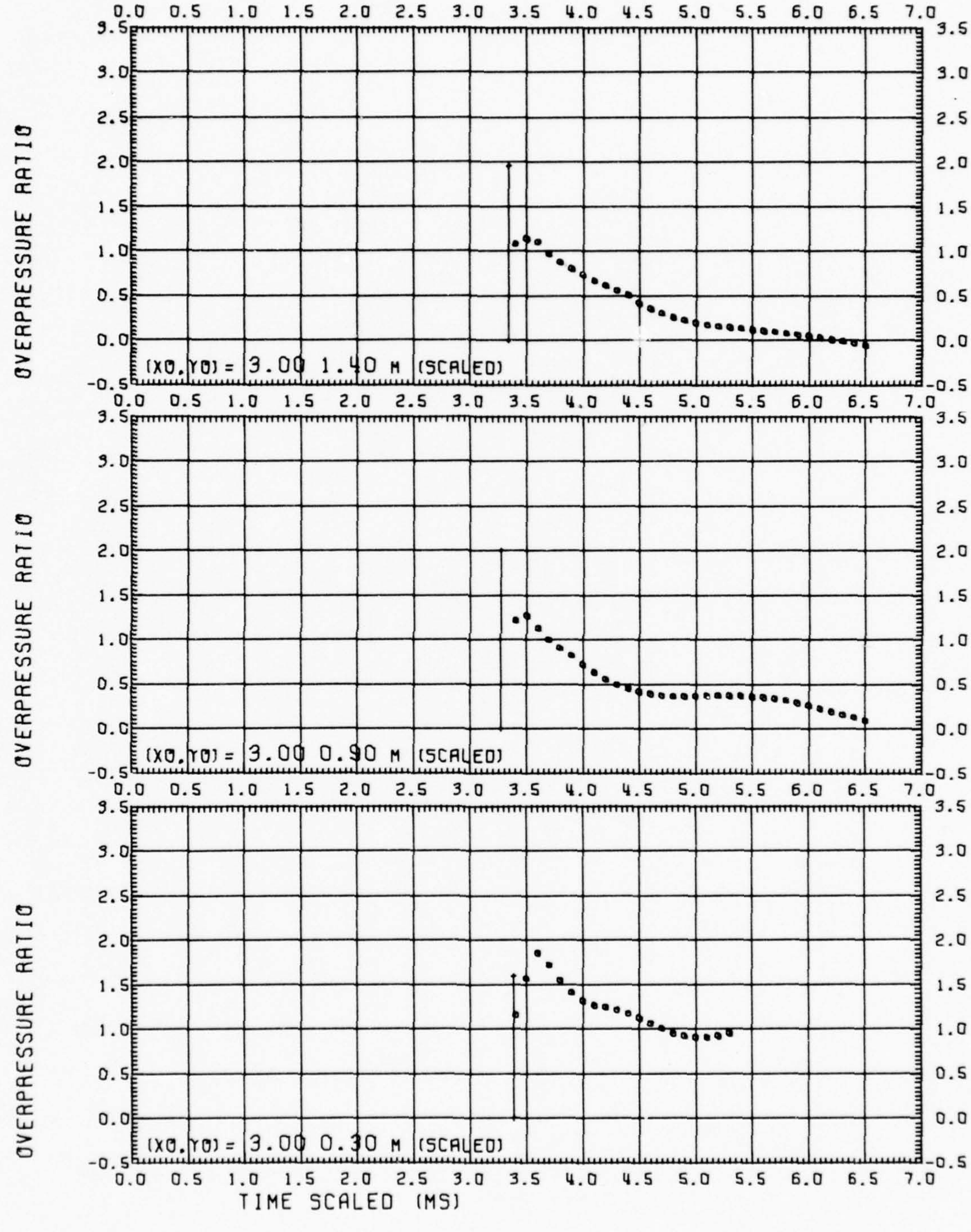


Fig. 25.4 DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

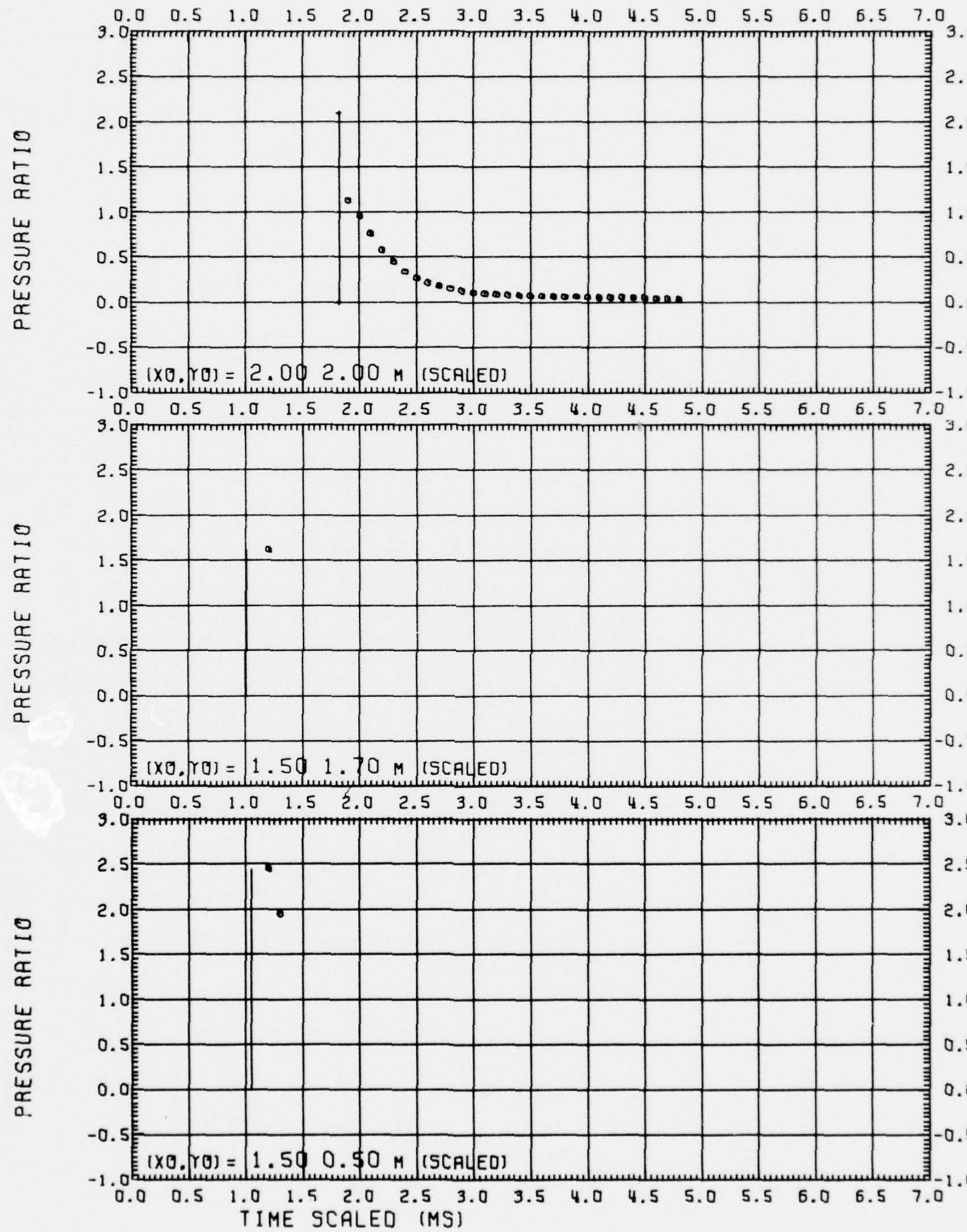


Fig. 26.1 DIPOLE WEST/10 DYNAMIC PRESSURE

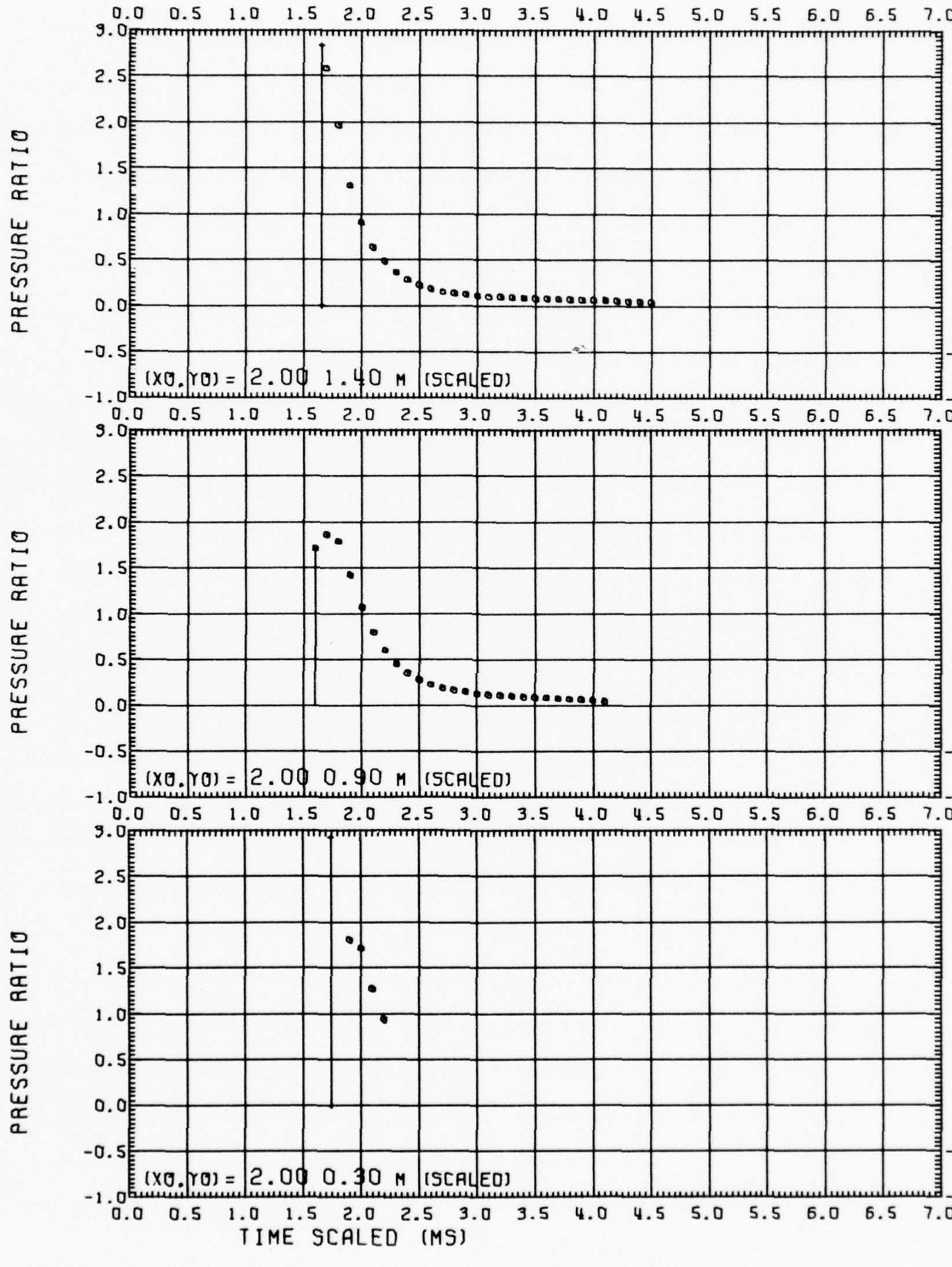


Fig. 26.2 DIPOLE WEST/10 DYNAMIC PRESSURE

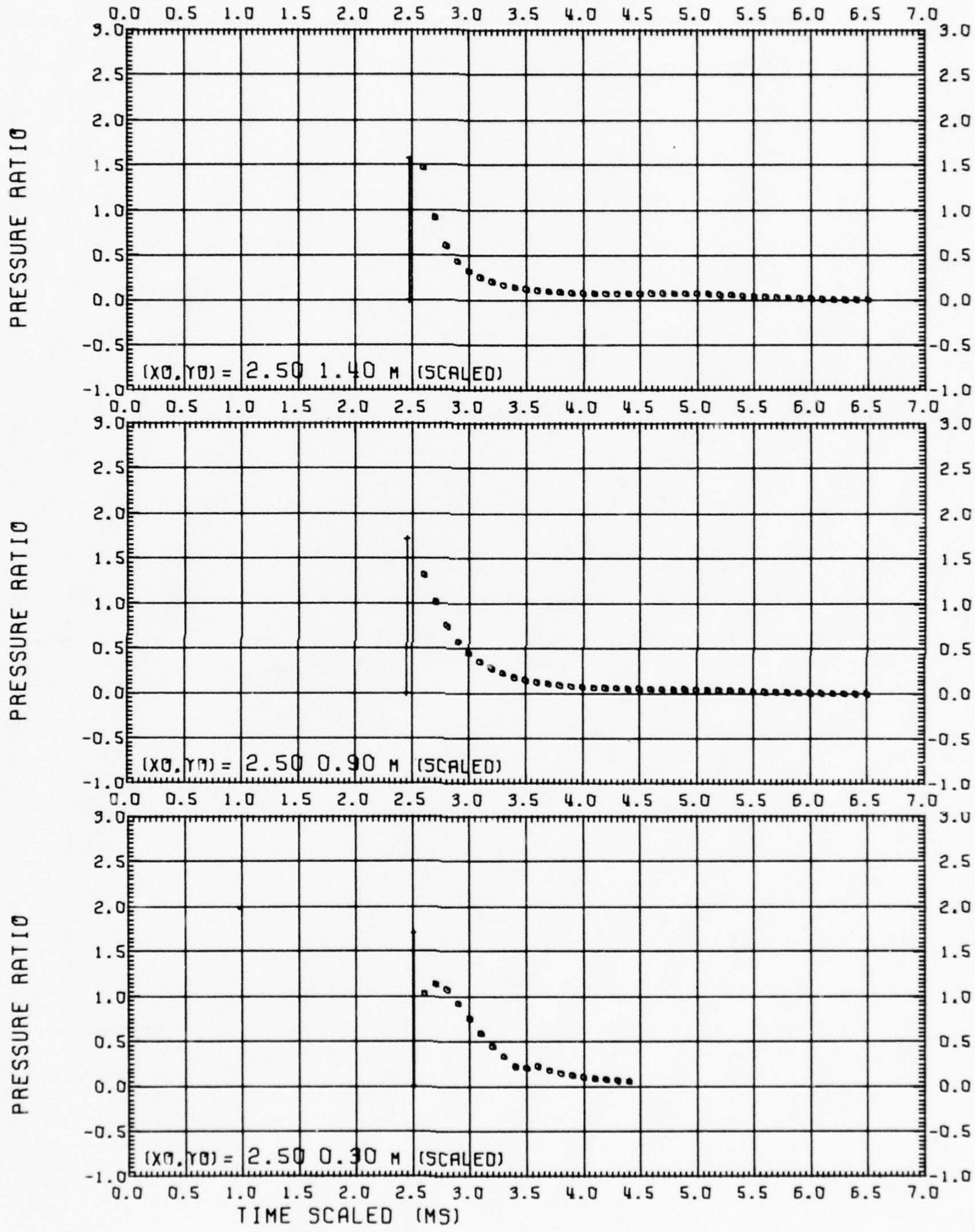


Fig. 26.3 DIPOLE WEST/10 DYNAMIC PRESSURE

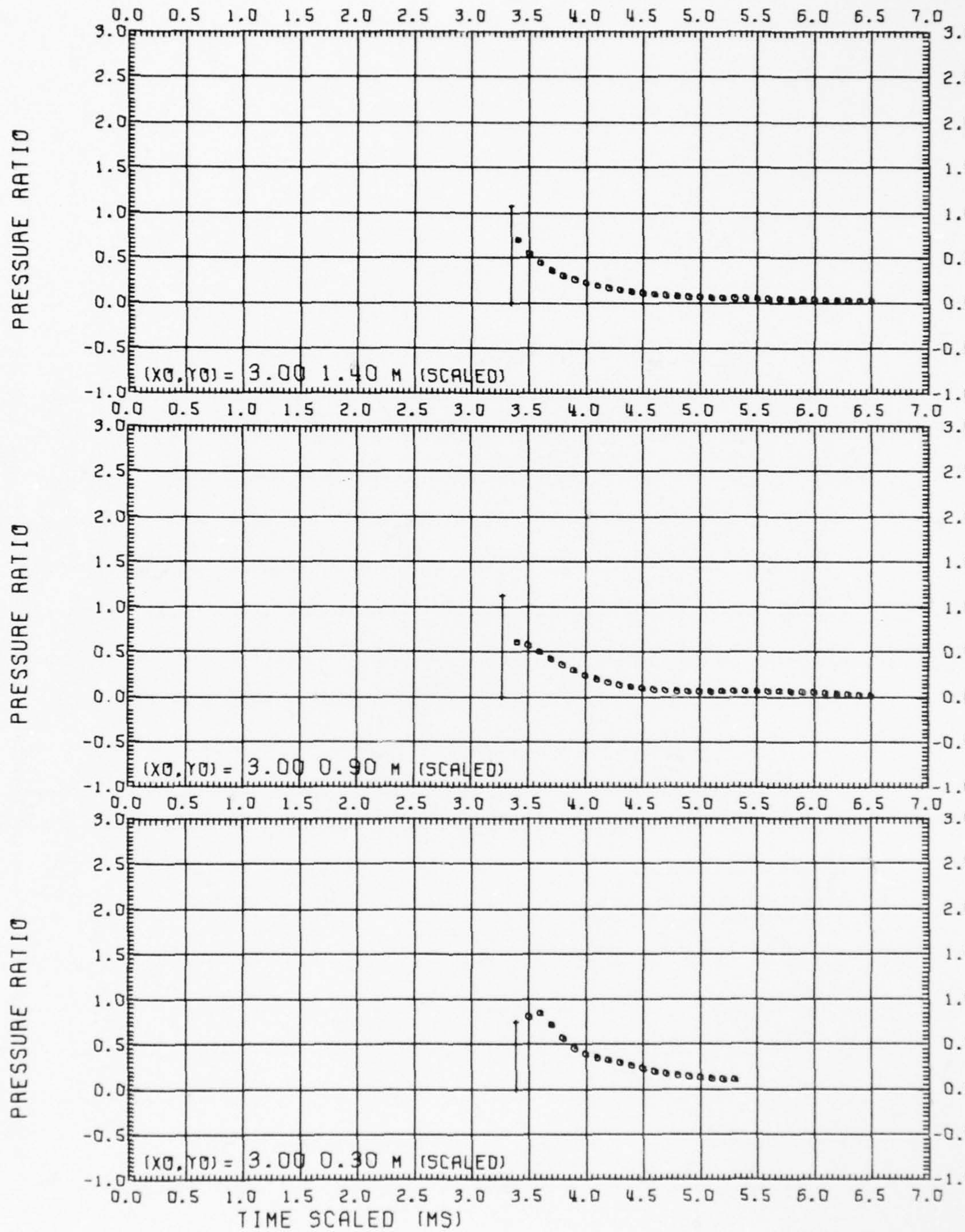
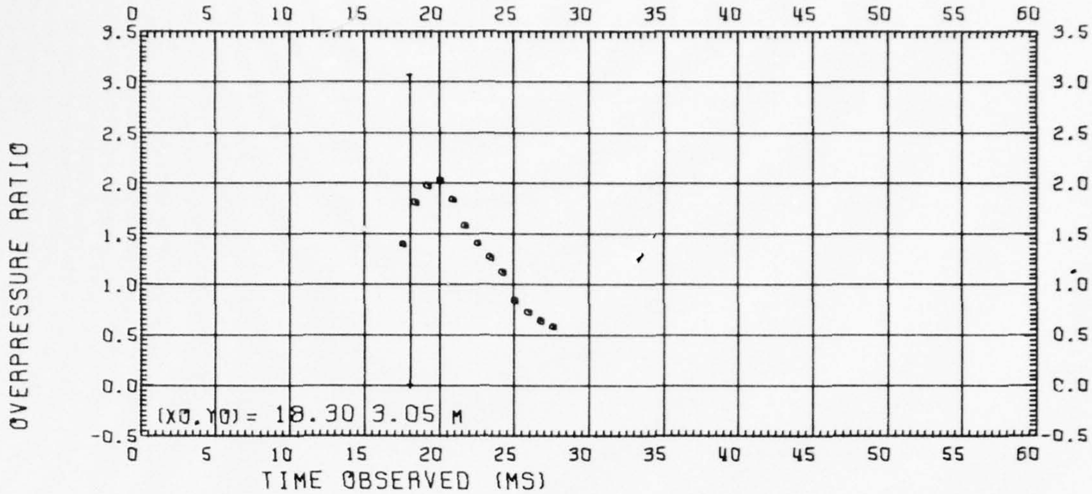
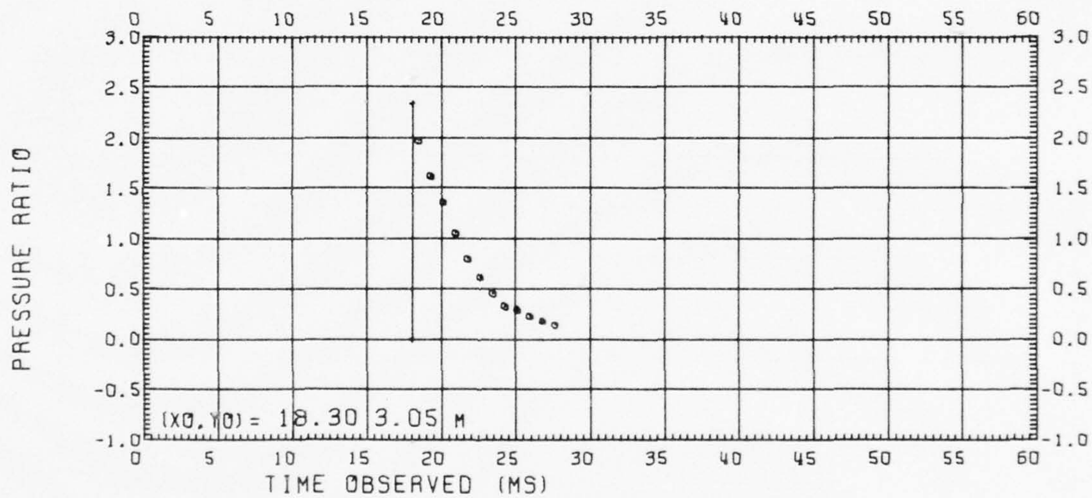


Fig. 26.4 DIPOLE WEST/10 DYNAMIC PRESSURE



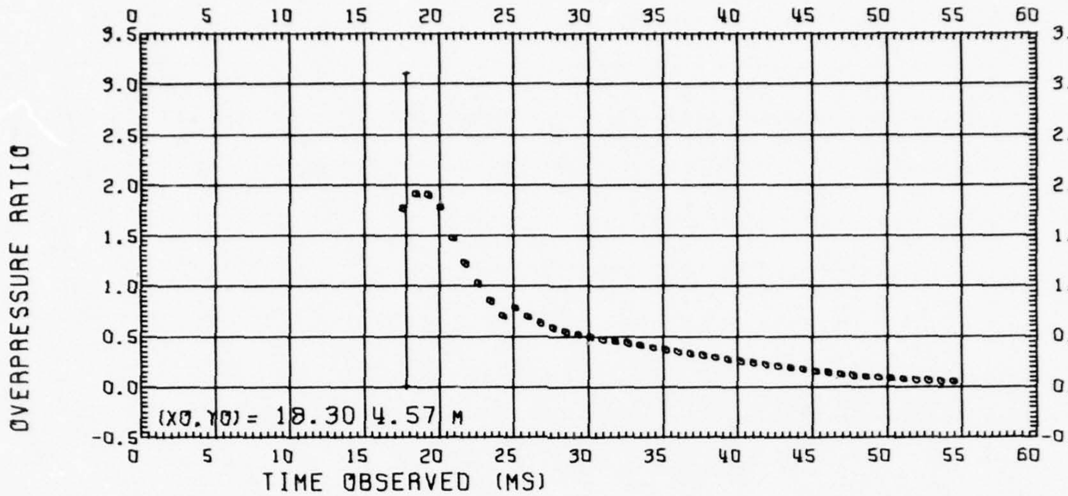
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



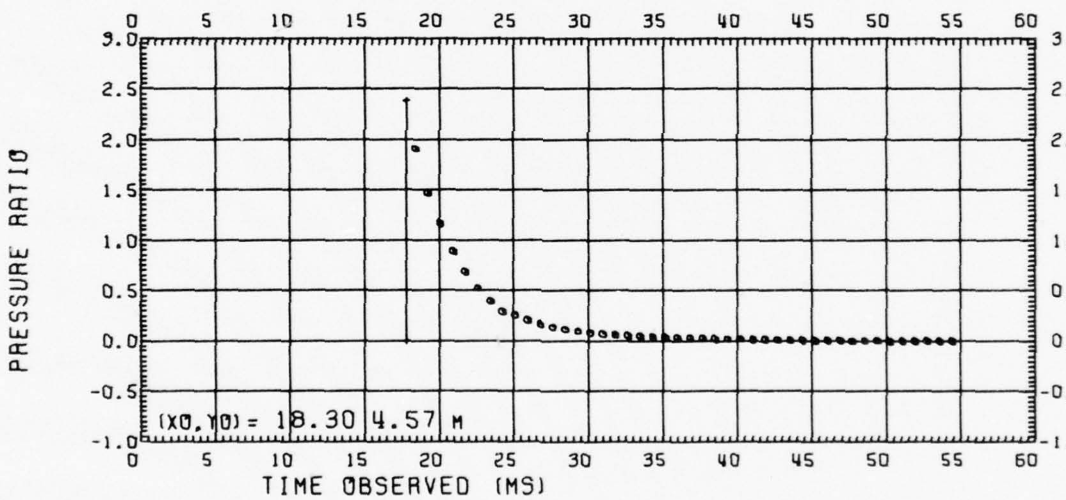
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.1

PRESSURE RESULTS AT GAUGE POSITION (XO,YO) = 60 FT, 10 FT



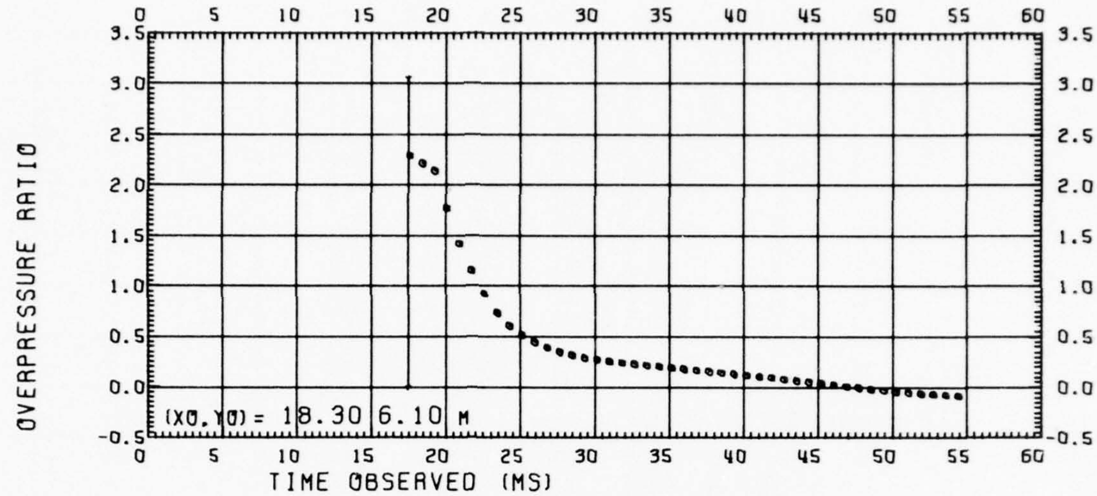
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



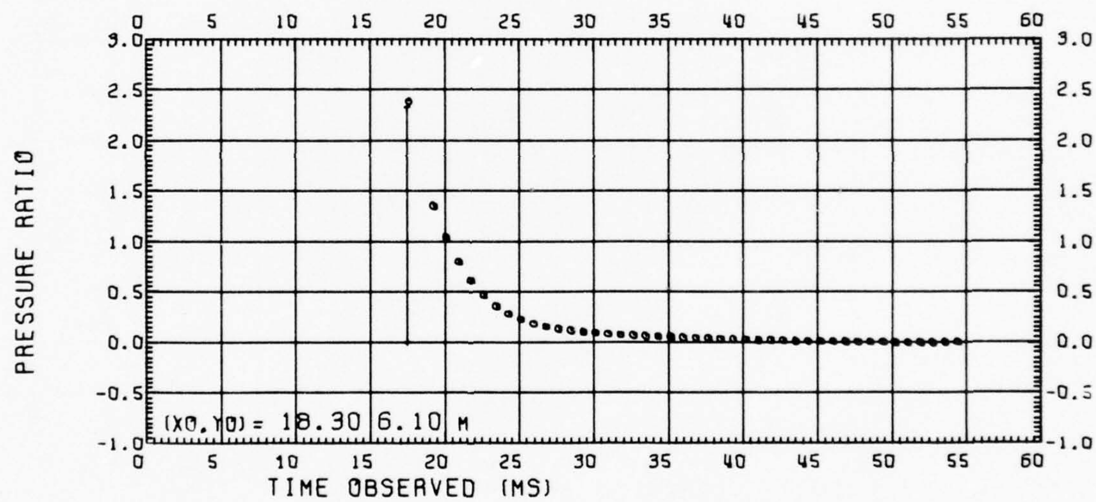
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.2

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 15 FT



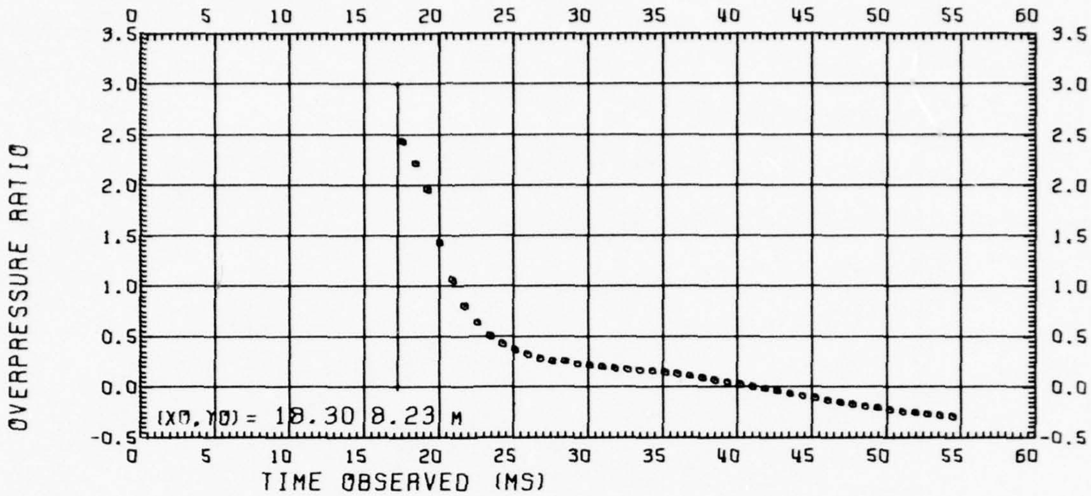
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



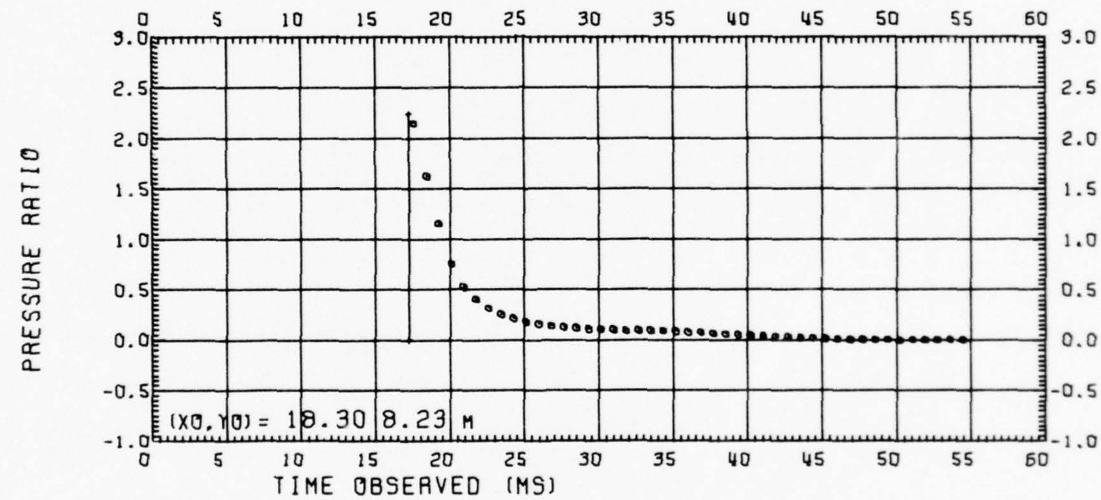
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.3

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 20 FT



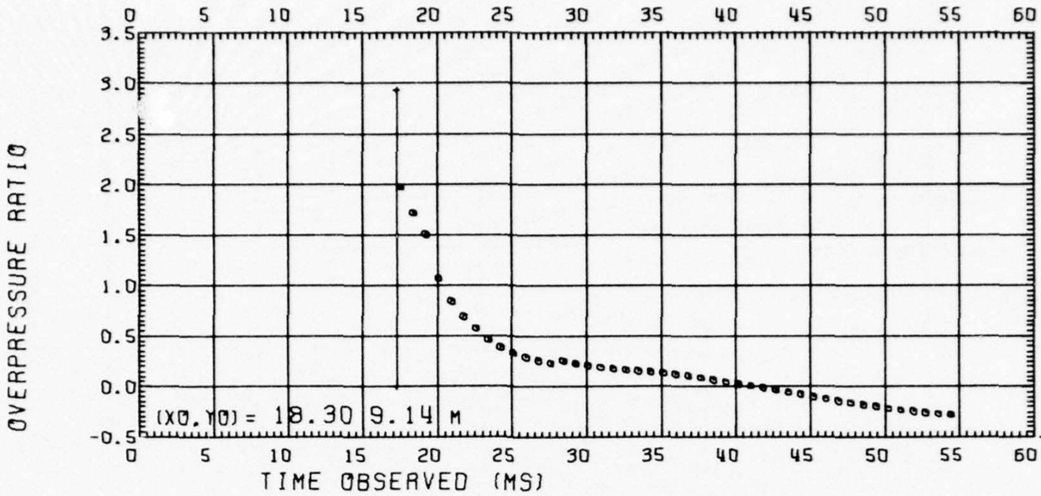
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



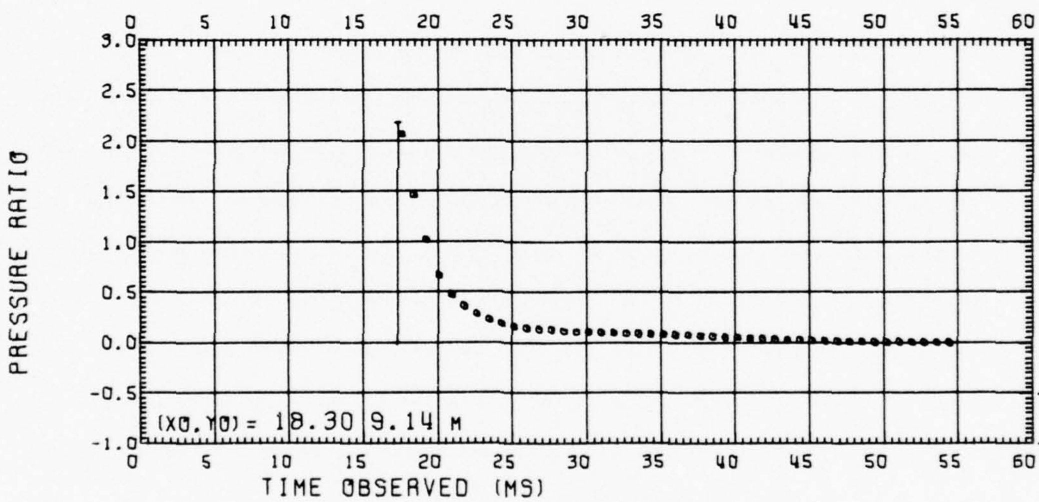
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.4

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 27 FT



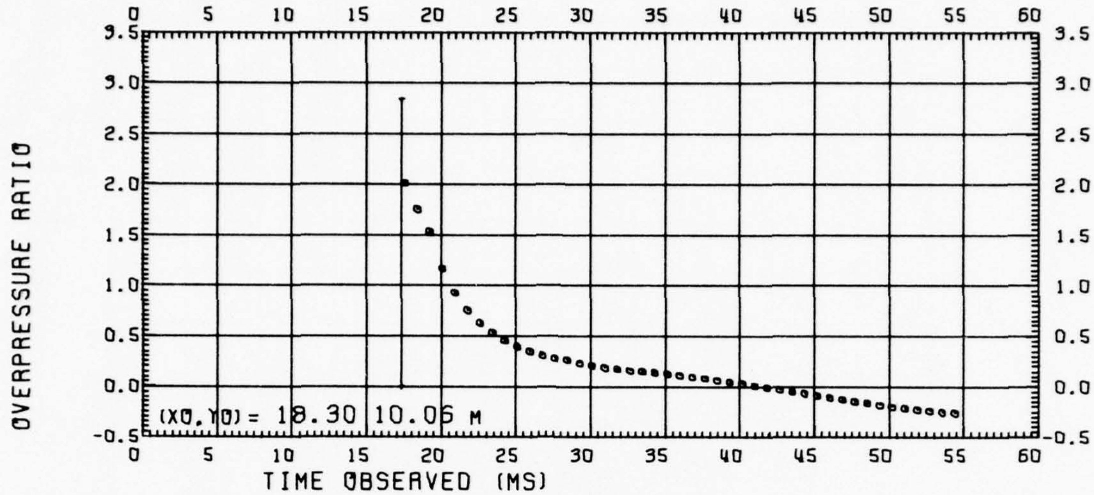
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



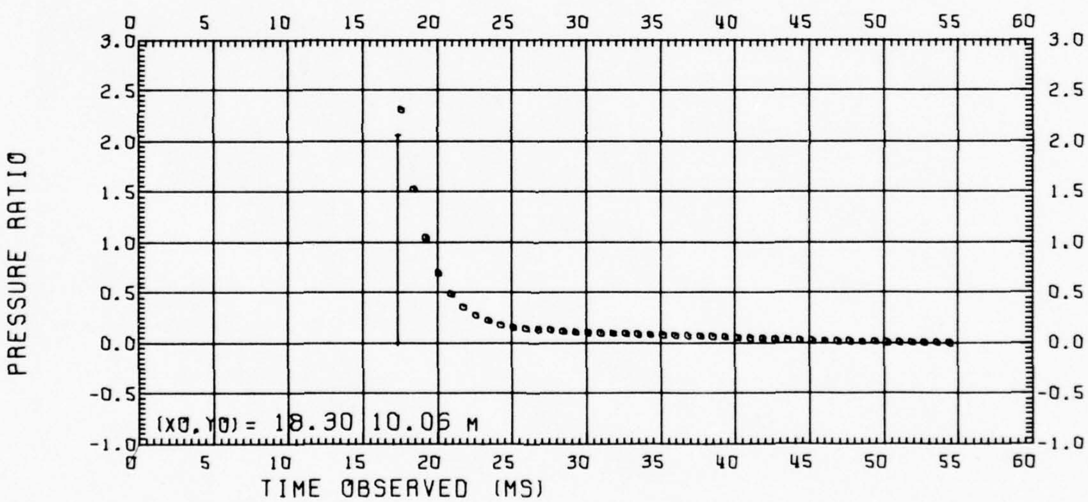
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.5

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 30 FT



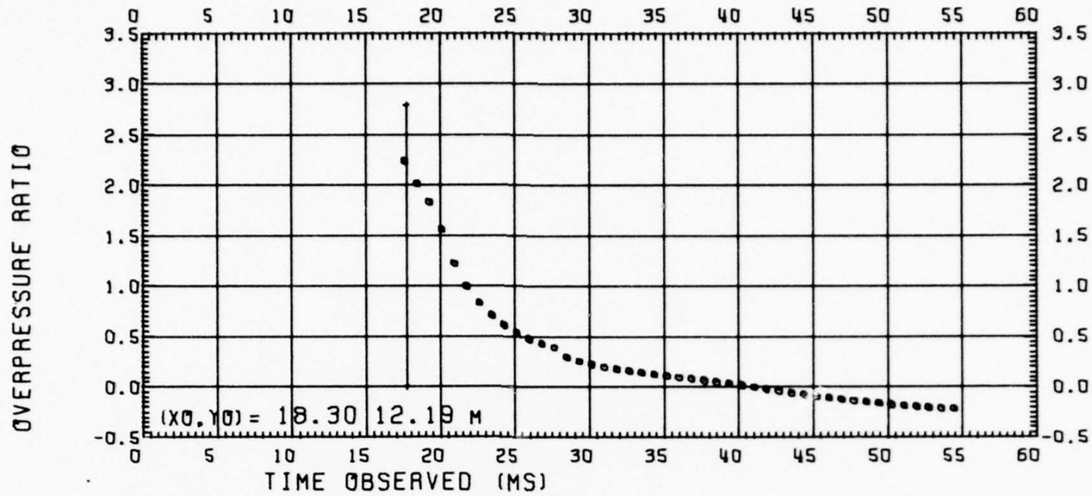
DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



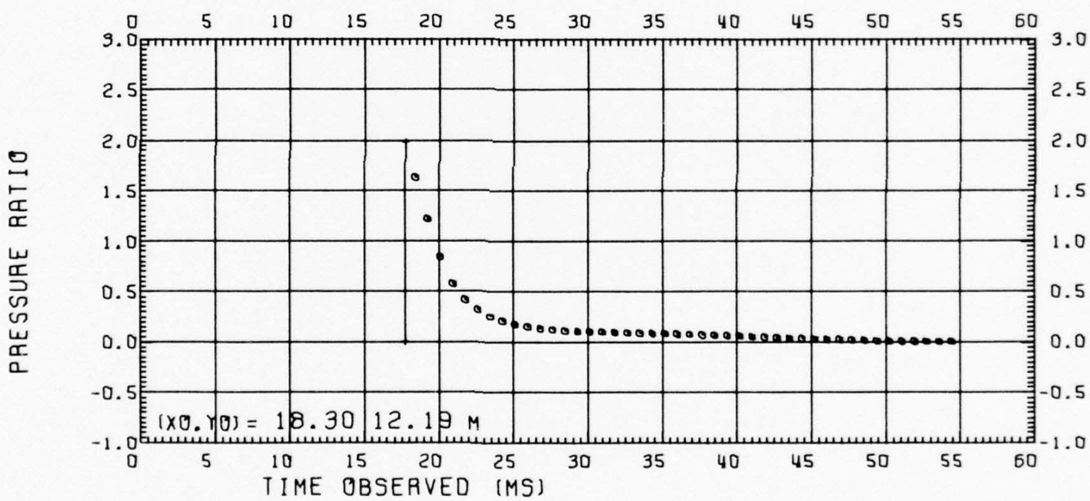
DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.6

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 33 FT



DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE



DIPOLE WEST/10 DYNAMIC PRESSURE

Fig. 27.7

PRESSURE RESULTS AT GAUGE POSITION (XO.YO) = 60 FT. 40 FT

TABLE 1

SURVEY DATA LIST   DIPOLE WEST/10   /A770322

PT. NAME	BEARING	DISTANCE	COORD. E	COORD. N	COORD. H
GRD.ZERO	0. 0. 0	0.0	2000.000	2000.000	2316.320
G.ZERO.B	230.55. 5	1.229	1999.046	1999.225	2316.320
G.ZERO.C			1998.965	1999.407	2316.320
BOT.CRG.	230.55. 5	1.229	1999.046	1999.225	2331.240
TOP.CRG.	249.41.17	1.190	1998.884	1999.583	2361.683
MCP	180. 2.47	598.713	1998.289	1401.290	2313.750
WF5/295			2002.619	1388.290	2341.720
VP 1A	333.24.43	106.193	1952.548	2095.052	2348.823
VP 1B	333.24.40	106.422	1952.533	2095.250	2383.752
VP 2A	317.56.24	121.905	1918.429	2050.592	2348.640
VP 2B	317.48.50	122.407	1917.996	2090.878	2383.605
VP 3A	305.18.51	149.196	1878.448	2086.514	2348.376
VP 3B	305.12.35	149.142	1878.275	2096.176	2383.340
W 1	257.20.55	35.586	1965.259	1992.289	2318.150
W 2	260.21.43	70.394	1930.578	1988.344	2318.070
W 3	261.29.48	105.189	1895.935	1984.663	2317.350
300 W1	183.38.57	314.760	1979.184	1685.909	2330.730
300 W2	187.40.48	320.020	1956.569	1682.941	2330.260
1-20.10	84. 7.37	19.875	2019.774	2002.002	2326.369
1-20.15	83.52.20	19.864	2019.752	2002.103	2331.376
1-20.20	84.12.46	19.889	2019.792	2001.966	2336.381
1-20.27	83.53.34	19.841	2019.731	2002.082	2343.354
1-20.30	83.45. 6	19.806	2019.689	2002.150	2346.363
1-20.33	83.43.18	19.790	2019.673	2002.149	2349.316
1-20.40	84. 4.43	19.819	2019.717	2002.008	2356.412
1-30.10	69.25. 1	29.023	2027.171	2010.202	2326.517
1-30.15	68.48.13	29.890	2027.874	2010.791	2331.406
1-30.20	68.23. 2	30.020	2027.910	2011.056	2336.462
1-30.27	68.52.31	29.873	2027.880	2010.729	2343.442
1-30.30	68.54.25	29.879	2027.889	2010.722	2346.473
1-30.33	68.52.56	29.935	2027.951	2010.717	2349.432
1-30.40	68.36. 6	30.017	2027.950	2010.944	2356.023

BEARING IN DEGREES, MINUTES, AND SECONDS, AND DISTANCE IN FEET
BEARING AND DISTANCE FROM GRD.ZERO UNLESS NOTED OTHERWISE
COORDINATES EAST AND NORTH AND ELEVATION IN FEET
TOTAL NUMBER OF POINTS SURVEYED IS 32

SUNDRY DATA LIST

T= 21.3 DEG F. P= 13.7 PSI. SVP 2.95 MM HG. PH= 81.0%. W= 1080.0 LBS
SCALING TO WO= 2.2 LBS USING FACTORS S= 8.072 AND C= 1.076 FT/MSEC

CALCULATED DISTANCE BETWEEN BOT.CRG. AND G.ZERO.B IS 14.920 FEET 1
CALCULATED DISTANCE BETWEEN TOP.CRG. AND BOT.CRG. IS 30.445 FEET 2
CALCULATED DISTANCE BETWEEN GRD.ZERO AND G.ZERO.C IS 1.193 FEET

FIRED ON 02NOV73

TABLE 2

PHOTOGRAMMETRICS DIPOLE WEST/10 WES/295 /A770322

CAMERA (LENS) POSITION IS 2002.619 FEET EAST, 1388.290 FEET NORTH, AND 2341.720 FEET ELEVATION
OPTICAL AXIS IS ORIENTED TO -6.780 DEGREES EAST OF NORTH AND 0.575 DEGREES ELEVATION (±0.001)
OBJECT PLANE IS 606.989 FEET FROM CAMERA, PERPENDICULAR TO OPTICAL AXIS, AND INCLUDES G.ZERO.C

CALIBRATION DATA TRANSFORMED TO THE OBJECT PLANE IN FEET

PT. NAME	COORD X	COORD Y	SHIFT X	SHIFT Y	
ROT.CRG.	68.649	-16.411	-0.094	-0.166	
TOP.CRG.	68.319	14.100	0.048	-0.253	
VP 1A	27.651	0.083	1.351	-0.087	
VP 1B	27.435	30.034	1.430	-0.109	
VP 2A	-0.555	-0.290	-0.038	0.133	
VP 2B	-1.061	29.635	0.130	0.177	
VP 3A	-34.632	-0.388	-0.408	-0.001	
VP 3B	-35.154	29.553	-0.024	0.031	
W 1	34.340	-29.787	0.000	-0.000	REFERENCE POINT P1
W 2	-0.656	-29.864	-0.044	0.003	
W 3	-35.633	-30.568	0.001	0.002	REFERENCE POINT P2
300 W1	24.105	-28.465	0.021	-0.003	
300 W2	-22.297	-28.431	0.026	-0.976	
1-20.10	90.205	-21.518	-0.807	0.076	
1-20.15	90.192	-16.171	-0.802	-0.252	
1-20.20	90.060	-11.231	-0.618	-0.202	
1-20.27	89.918	-4.277	-0.536	-0.186	
1-20.30	90.003	-1.215	-0.669	-0.242	
1-20.33	89.860	1.986	-0.546	-0.493	
1-20.40	89.927	8.930	-0.583	-0.346	
1-30.10	98.639	-21.283	-2.089	0.169	
1-30.15	98.467	-16.086	-1.223	-0.190	
1-30.20	98.512	-11.108	-1.233	-0.175	
AVERAGES			-0.292	-0.135	

X-AXIS IS PARALLEL TO HORIZONTAL PLANE AND ORIGIN IS WHERE OPTICAL AXIS INTERSECTS OBJECT PLANE
SHIFTS IN CALIBRATION DATA DEFINE THE POSITION OF POINT AS CALCULATED DIRECTLY FROM SURVEY DATA

MAXIMUM CALIBRATION ERROR SCALED= 0.080 FEET
MAXIMUM CAMERA ORIENTATION ERROR= 0.011 FEET

TOTAL ERRORS IN THE OBJECT PLANE= 0.091 FEET

RUNNING DATA IS TRANSFORMED TO OBJECT PLANE USING REFERENCE POINTS VP 3B AND 300 W2
AND A CAMERA OPTICS BASED ON CALIBRATION DATA IN THE OBJECT PLANE RATHER [illegible]N SURVEY DATA

TABLE 3

FILM TIMING DATA   DIPOLE WEST/10   WF5/295   /A770322

STATIC ZERO =   3.90   CM
ACTUAL ZERO =   4.83   CM
FRAME LENGTH=   0.94620 CM

FRAME NO.	5-MSEC DISTANCE	FILM SPEED
-31	15.82 CM	3344./SEC
069	16.16 CM	3416./SEC
169	16.53 CM	3494./SEC
269	16.83 CM	3557./SEC

STATIC ZERO IS CONSTANT FOR THE CAMERA
OTHER LENGTHS ARE FROM FILM MEASURMENT

FRAME TIMES (MS) FOR FRAMES 1 THROUGH 200 ARE:

1	0.6	2	0.9	3	1.2	4	1.5	5	1.8	6	2.1	7	2.4	8	2.7	9	3.0	10	3.3
11	3.6	12	3.9	13	4.2	14	4.4	15	4.7	16	5.0	17	5.3	18	5.6	19	5.9	20	6.2
21	6.5	22	6.8	23	7.1	24	7.4	25	7.7	26	8.0	27	8.3	28	8.6	29	8.9	30	9.2
31	9.5	32	9.8	33	10.1	34	10.4	35	10.7	36	11.0	37	11.2	38	11.5	39	11.8	40	12.1
41	12.4	42	12.7	43	13.0	44	13.3	45	13.6	46	13.9	47	14.2	48	14.5	49	14.8	50	15.1
51	15.4	52	15.7	53	16.0	54	16.2	55	16.5	56	16.8	57	17.1	58	17.4	59	17.7	60	18.0
61	18.3	62	18.6	63	18.9	64	19.2	65	19.5	66	19.8	67	20.1	68	20.4	69	20.6	70	20.9
71	21.2	72	21.5	73	21.8	74	22.1	75	22.4	76	22.7	77	23.0	78	23.3	79	23.6	80	23.9
81	24.2	82	24.4	83	24.7	84	25.0	85	25.3	86	25.6	87	25.9	88	26.2	89	26.5	90	26.8
91	27.1	92	27.4	93	27.7	94	27.9	95	28.2	96	28.5	97	28.8	98	29.1	99	29.4	100	29.7
101	30.0	102	30.3	103	30.6	104	30.9	105	31.1	106	31.4	107	31.7	108	32.0	109	32.3	110	32.6
111	32.9	112	33.2	113	33.5	114	33.8	115	34.0	116	34.3	117	34.6	118	34.9	119	35.2	120	35.5
121	35.8	122	36.1	123	36.4	124	36.6	125	36.9	126	37.2	127	37.5	128	37.8	129	38.1	130	38.4
131	38.7	132	39.0	133	39.2	134	39.5	135	39.8	136	40.1	137	40.4	138	40.7	139	41.0	140	41.3
141	41.5	142	41.8	143	42.1	144	42.4	145	42.7	146	43.0	147	43.3	148	43.6	149	43.9	150	44.1
151	44.4	152	44.7	153	45.0	154	45.3	155	45.6	156	45.9	157	46.1	158	46.4	159	46.7	160	47.0
161	47.3	162	47.6	163	47.9	164	48.2	165	48.4	166	48.7	167	49.0	168	49.3	169	49.6	170	49.9
171	50.2	172	50.4	173	50.7	174	51.0	175	51.3	176	51.6	177	51.9	178	52.2	179	52.4	180	52.7
181	53.0	182	53.3	183	53.6	184	53.9	185	54.2	186	54.4	187	54.7	188	55.0	189	55.3	190	55.6
191	55.9	192	56.2	193	56.4	194	56.7	195	57.0	196	57.3	197	57.6	198	57.9	199	58.1	200	58.4

TABLE 4

TIMES OF ARRIVAL   DIPOLE WEST/10 WES/295   SMOKE PUFF GRID 1209   /A770322

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY PH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 326.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION /2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

INITIAL PUFF POSITIONS, TIMES OF ARRIVAL, AND PEAK PARTICLE VELOCITIES DERIVED BY TRAJECTORY FITTING

PUFF NUMBER	X-OBS METERS	Y-OBS METERS	T-OBS MSEC	X-SCAL METERS	Y-SCAL METERS	T-SCAL MSEC	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGION CODE
1	8.200	17.624	4.447	1.016	2.183	0.531	2.169	0.829	2.322	1.119	2
2	8.226	16.107	4.151	1.019	1.996	0.496	2.224	0.436	2.256	1.058	2
3	7.974	14.417	3.558	0.988	1.786	0.425	2.247	0.215	2.257	0.991	2
4	8.156	13.083	3.558	1.010	1.621	0.425	2.172	-0.131	2.176	1.015	2
5	8.042	11.391	4.151	0.996	1.411	0.476	2.378	-0.456	2.421	1.041	2
6	8.004	9.934	4.447	0.992	1.231	0.531	2.662	0.324	2.681	0.996	5
7	7.983	8.420	4.447	0.989	1.043	0.531	2.043	0.464	2.095	0.994	4
8	7.992	7.051	3.854	0.990	0.874	0.460	1.705	0.154	1.711	1.038	1
9	7.762	5.750	3.558	0.962	0.712	0.425	2.010	0.194	2.019	0.973	1
10	8.125	3.944	3.854	1.007	0.489	0.460	1.889	-0.168	1.896	1.009	1
11	7.704	2.476	4.151	0.954	0.307	0.496	2.117	-0.460	2.166	0.988	1
12	7.464	0.922	4.447	0.925	0.114	0.531	2.460	-0.643	2.542	1.028	1
13	10.726	17.538	7.112	1.329	2.173	0.849	1.310	0.476	1.394	1.406	2
14	10.769	15.741	6.520	1.334	1.950	0.779	1.411	0.302	1.443	1.355	2
15	10.781	14.142	6.520	1.336	1.752	0.779	1.606	0.087	1.608	1.336	2
16	10.676	12.764	6.520	1.323	1.581	0.779	1.810	-0.031	1.810	1.329	2
17	10.830	11.460	6.816	1.342	1.420	0.814	0.519	-0.887	1.028	1.373	2
18	10.849	10.108	6.816	1.344	1.252	0.814	0.869	-0.115	0.877	1.349	5
19	11.105	8.380	7.407	1.376	1.038	0.885	2.211	-0.417	2.250	1.379	4
20	10.876	6.851	7.112	1.347	0.849	0.849	1.813	-0.148	1.819	1.377	1
21	10.717	5.393	6.816	1.328	0.668	0.814	1.700	-0.024	1.700	1.332	1
22	10.643	3.889	6.816	1.319	0.482	0.814	1.674	-0.122	1.679	1.321	1
23	10.528	2.520	7.112	1.304	0.312	0.849	1.621	-0.221	1.637	1.328	1
24	11.094	0.819	8.294	1.374	0.101	0.990	1.537	-0.072	1.539	1.378	3
25	13.407	17.676	10.656	1.661	2.190	1.272	0.863	0.153	0.877	1.728	2
26	13.443	16.047	10.361	1.665	1.988	1.237	1.118	0.064	1.120	1.688	2
27	13.485	14.351	10.361	1.671	1.778	1.237	1.423	0.091	1.426	1.672	2
28	13.563	12.895	10.361	1.680	1.598	1.237	0.944	0.341	1.004	1.694	2
29	13.688	11.402	10.361	1.696	1.413	1.237	1.793	0.371	1.831	1.718	5
30	13.703	9.978	10.361	1.698	1.236	1.237	1.714	0.226	1.729	1.701	5
31	13.742	8.472	10.361	1.703	1.050	1.237	1.708	-0.195	1.719	1.705	4
32	13.656	6.951	10.361	1.692	0.861	1.237	1.497	-0.383	1.546	1.714	4
33	13.832	5.513	11.246	1.714	0.683	1.343	1.487	-0.351	1.528	1.718	1
34	13.897	3.955	11.246	1.722	0.490	1.343	0.439	0.119	0.454	1.723	1
35	13.654	2.423	11.246	1.692	0.300	1.343	1.361	-0.006	1.361	1.712	1
36	13.548	0.857	11.246	1.678	0.106	1.343	1.160	0.175	1.173	1.682	3
37	15.641	17.445	14.191	1.938	2.161	1.695	0.884	0.141	0.895	1.989	2
38	15.634	15.939	14.191	1.937	1.975	1.695	1.144	0.144	1.153	1.954	2
39	15.628	14.372	14.191	1.936	1.781	1.695	1.160	0.350	1.212	1.937	2
40	15.774	12.896	13.308	1.954	1.598	1.589	1.300	0.387	1.357	2.007	5
41	15.825	11.446	13.308	1.960	1.418	1.589	1.458	0.252	1.479	1.980	5
42	15.955	9.861	13.308	1.977	1.222	1.589	1.348	0.144	1.356	1.978	5
43	16.043	8.468	13.308	1.987	1.049	1.589	1.425	-0.311	1.458	1.989	4
44	16.175	6.953	13.308	2.004	0.861	1.589	1.094	-0.263	1.126	2.023	4
45	16.106	5.451	13.308	1.995	0.675	1.599	0.934	-0.251	0.568	2.048	4

TABLE 4 (continued)

46	16.236	3.827	14.191	2.018	0.474	1.695	0.264	-0.049	0.269	2.073	3
47	15.904	2.318	14.191	1.970	0.287	1.695	0.429	0.026	0.430	1.991	3
48	15.891	0.882	14.191	1.965	0.109	1.695	0.567	-0.250	0.620	1.972	3
49	17.437	17.237	18.010	2.160	2.135	2.151	0.849	0.178	0.867	2.201	2
50	17.533	15.435	18.010	2.178	1.974	2.151	1.183	0.307	1.227	2.194	2
51	17.692	14.371	17.130	2.192	1.780	2.046	1.147	0.404	1.216	2.284	5
52	17.851	12.895	17.130	2.212	1.597	2.046	1.300	0.237	1.322	2.259	5
53	18.037	11.410	17.130	2.235	1.414	2.046	1.323	0.219	1.342	2.251	5
54	18.176	10.096	17.130	2.252	1.251	2.046	1.441	0.025	1.441	2.255	5
55	18.243	8.442	17.130	2.260	1.045	2.046	1.309	-0.045	1.309	2.262	4
56	18.148	7.036	17.130	2.248	0.872	2.046	1.235	0.129	1.242	2.264	4
57	18.047	5.541	17.130	2.236	0.686	2.046	1.118	-0.213	1.138	2.281	4
58	18.086	3.811	17.717	2.241	0.472	2.116	1.378	-0.103	1.381	2.290	3
59	17.846	2.280	17.423	2.211	0.282	2.081	0.870	-0.122	0.879	2.229	3
60	17.952	0.859	17.423	2.224	0.106	2.081	0.464	0.045	0.466	2.227	3
61	19.779	17.654	21.233	2.450	2.187	2.535	0.741	0.428	0.856	2.496	2
62	19.793	16.050	20.940	2.451	1.988	2.501	0.851	0.460	0.967	2.594	5
63	19.910	14.438	20.940	2.467	1.789	2.501	1.057	0.410	1.133	2.551	5
64	20.190	13.062	20.940	2.500	1.618	2.501	1.108	0.368	1.157	2.546	5
65	20.295	11.638	20.940	2.514	1.442	2.501	1.207	0.259	1.235	2.533	5
66	20.369	10.211	20.940	2.523	1.265	2.501	1.195	0.178	1.208	2.527	5
67	20.432	8.750	20.940	2.531	1.064	2.501	1.051	-0.019	1.051	2.532	4
68	20.436	7.055	20.940	2.532	0.874	2.501	1.000	-0.026	1.000	2.546	4
69	20.278	5.554	20.940	2.512	0.688	2.501	1.013	-0.119	1.020	2.552	4
70	20.521	4.395	20.940	2.542	0.544	2.501	0.875	-0.028	0.876	2.611	4
71	20.179	2.487	20.940	2.500	0.308	2.501	0.889	-0.046	0.690	2.519	3
72	20.021	1.091	20.940	2.480	0.135	2.501	0.485	-0.093	0.494	2.484	3
73	21.857	17.465	24.155	2.708	2.164	2.884	0.449	0.146	0.472	2.896	5
74	21.929	15.693	24.155	2.717	1.944	2.884	0.444	0.079	0.451	2.834	5
75	22.186	14.330	24.155	2.749	1.775	2.884	0.539	0.221	0.582	2.821	5
76	22.390	12.982	24.155	2.774	1.608	2.884	0.560	0.103	0.569	2.813	5
77	22.497	11.587	24.155	2.787	1.435	2.884	0.678	0.119	0.688	2.803	5
78	22.472	10.262	24.155	2.784	1.271	2.884	0.809	0.320	0.870	2.787	5
79	22.659	8.392	24.155	2.807	1.040	2.884	0.626	0.037	0.627	2.809	4
80	22.472	7.064	24.155	2.784	0.875	2.884	0.752	0.026	0.753	2.796	4
81	22.420	5.466	24.155	2.778	0.677	2.884	0.829	0.102	0.835	2.816	4
82	22.270	3.991	24.447	2.759	0.494	2.919	0.980	-0.145	0.991	2.803	3
83	22.272	2.166	24.739	2.759	0.268	2.954	0.672	-0.205	0.703	2.772	3
84	22.184	0.907	24.739	2.748	0.112	2.954	0.835	-0.355	0.907	2.751	3
85	24.009	17.591	29.689	2.974	2.179	3.545	0.515	0.120	0.528	3.151	5
86	24.111	16.130	29.689	2.987	1.998	3.545	0.865	0.199	0.887	3.108	5
87	24.467	14.581	29.689	3.031	1.806	3.545	0.827	0.415	0.926	3.104	5
88	24.514	12.971	29.689	3.037	1.607	3.545	0.879	0.308	0.931	3.073	5
89	24.141	11.501	27.944	2.991	1.425	3.337	0.833	0.018	0.833	3.004	5
90	24.285	10.185	27.944	3.009	1.262	3.337	0.951	0.086	0.955	3.011	5
91	24.438	8.778	27.944	3.028	1.087	3.337	0.766	-0.077	0.769	3.028	4
92	24.528	7.211	27.944	3.039	0.893	3.337	0.739	-0.004	0.739	3.049	4
93	24.146	5.441	27.944	2.991	0.674	3.337	0.968	0.000	0.968	3.027	4
94	24.047	4.011	27.944	2.979	0.497	3.337	0.836	-0.148	0.849	3.047	4
95	24.318	2.558	28.526	3.013	0.317	3.406	0.741	0.010	0.741	3.029	3
96	24.052	0.686	28.526	2.980	0.085	3.406	0.786	-0.011	0.787	2.981	3
97	25.502	17.444	32.882	3.159	2.161	3.927	0.527	-0.007	0.527	3.321	5
98	25.699	15.892	32.882	3.184	1.969	3.927	0.759	0.272	0.806	3.290	5
99	26.020	14.612	32.882	3.224	1.810	3.927	0.927	0.217	0.952	3.293	5
100	25.890	13.051	32.012	3.207	1.617	3.823	0.860	0.073	0.863	3.243	5
101	25.968	11.514	30.851	3.217	1.426	3.684	0.606	-0.004	0.606	3.230	5
102	25.799	9.996	30.851	3.196	1.238	3.684	0.787	-0.107	0.794	3.198	5
103	25.843	8.665	30.851	3.202	1.073	3.684	0.677	-0.030	0.678	3.202	4
104	25.879	7.125	30.851	3.206	0.883	3.684	0.709	0.062	0.711	3.216	4
105	25.663	5.289	30.851	3.179	0.655	3.684	0.926	-0.047	0.927	3.216	4
106	25.690	3.953	30.851	3.183	0.490	3.684	0.773	0.024	0.773	3.220	3
107	25.689	2.527	31.432	3.183	0.313	3.753	0.938	-0.248	0.874	3.198	3
108	25.666	0.882	31.432	3.180	0.109	3.753	0.591	-0.148	0.609	3.182	3

TABLE 4 (continued)

X IS DISTANCE MEASURED HORIZONTALLY FROM GROUND ZERO.
Y IS DISTANCE MEASURED VERTICALLY ABOVE GROUND ZERO, AND
T IS TIME-OF-ARRIVAL INDICATED BY THE PUFF TRAJECTORY.
VELOCITIES ARE DERIVATIVES AT THE TIME OF ARRIVAL,
AND ARE EXPRESSED IN MACH UNITS RELATIVE TO C ABOVE.
R IS A RADIUS CALCULATED ACCORDING TO REGIONS DEFINED
ON BASIS OF FIRST SHOCK FRONT PASSING, CODED USING:

1= PRIMARY FRONT FROM LOWER CHARGE
2= PRIMARY FRONT FROM UPPER CHARGE
3= MACH STEM AT GROUND SURFACE
4= MACH STEM BELOW INTERACTION PLANE
5= MACH STEM ABOVE INTERACTION PLANE

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY EXPRESSED IN MACH UNITS IS INVARIANT UNDER SCALING.

TABLE 5.1

SHOCK FRONT DATA   DIPOLE WEST/10   WES/295   SMOKE PUFF GRID 1209   R1 /A770322

PRIMARY FRONT FROM LOWER CHARGE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION +2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
3.558	7.855	7.759	-0.096	0.425	0.961	2.976	9.165	865.016	2.200	3.835	9
3.854	8.148	8.055	-0.093	0.460	0.998	2.882	8.524	804.511	2.113	3.745	10
3.854	8.375	8.055	-0.321	0.460	0.998	2.882	8.524	804.511	2.113	3.745	8
4.151	7.978	8.341	0.363	0.496	1.033	2.799	7.974	752.598	2.035	3.663	11
4.447	8.298	8.620	0.321	0.531	1.068	2.725	7.497	707.622	1.965	3.586	12
6.816	10.664	10.640	-0.023	0.814	1.318	2.336	5.198	490.604	1.590	3.131	22
6.816	10.750	10.640	-0.110	0.814	1.318	2.336	5.198	490.604	1.590	3.131	21
7.112	10.722	10.874	0.152	0.849	1.347	2.303	5.021	473.923	1.557	3.089	23
7.112	11.117	10.874	-0.243	0.849	1.347	2.303	5.021	473.923	1.557	3.089	20
11.246	13.818	13.881	0.063	1.343	1.720	2.012	3.555	335.512	1.262	2.684	35
11.246	13.866	13.881	0.015	1.343	1.720	2.012	3.555	335.512	1.262	2.684	33
11.246	13.910	13.881	-0.029	1.343	1.720	2.012	3.555	335.512	1.262	2.684	34

T IS TIME-OF-ARRIVAL AND R IS RADIAL PUFF POSITION. RADIUS VALUES ARE FITTED USING RFIT=A+B*T+C*LOG(1+T).
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED,
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TC= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.2

SHOCK FRONT DATA   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   R2 /A770322

PRIMARY FRONT FROM UPPER CHARGE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION +2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
3.558	8.190	8.039	-0.151	0.425	0.996	3.221	10.938	1032.356	2.426	4.049	4
3.558	7.995	8.039	0.044	0.425	0.996	3.221	10.938	1032.356	2.426	4.049	3
4.151	8.403	8.663	0.260	0.496	1.073	2.971	9.135	862.150	2.196	3.831	5
4.151	8.536	8.663	0.127	0.496	1.073	2.971	9.135	862.150	2.196	3.831	2
4.447	9.036	8.957	-0.079	0.531	1.110	2.867	8.424	795.033	2.099	3.731	1
6.520	10.729	10.784	0.055	0.779	1.336	2.367	5.370	506.802	1.620	3.170	16
6.520	10.786	10.784	-0.001	0.779	1.336	2.367	5.370	506.802	1.620	3.170	15
6.520	10.938	10.784	-0.154	0.779	1.336	2.367	5.370	506.802	1.620	3.170	14
6.816	11.085	11.020	-0.065	0.814	1.365	2.317	5.098	481.141	1.571	3.107	17
7.112	11.349	11.251	-0.099	0.849	1.394	2.271	4.851	457.845	1.526	3.047	13
10.361	13.595	13.548	-0.047	1.237	1.678	1.923	3.146	296.924	1.169	2.550	28
10.361	13.496	13.548	0.053	1.237	1.678	1.923	3.146	296.924	1.169	2.550	27
10.361	13.625	13.548	-0.077	1.237	1.678	1.923	3.146	296.924	1.169	2.550	26
10.656	13.949	13.740	-0.209	1.272	1.702	1.901	3.048	287.656	1.145	2.517	25
14.191	15.637	15.897	0.260	1.695	1.969	1.703	2.218	209.358	0.930	2.203	39
14.191	16.054	15.897	-0.157	1.695	1.969	1.703	2.218	209.358	0.930	2.203	37
14.191	15.776	15.897	0.121	1.695	1.969	1.703	2.218	209.358	0.930	2.203	38
18.010	17.709	18.020	0.310	2.151	2.232	1.573	1.719	162.216	0.781	1.986	50
18.010	17.768	18.020	0.252	2.151	2.232	1.573	1.719	162.216	0.781	1.986	49
21.233	20.145	19.701	-0.444	2.535	2.441	1.497	1.449	136.744	0.691	1.857	61

T IS TIME-OF-ARRIVAL AND R IS RADIAL PUFF POSITION. RADIUS VALUES ARE FITTED USING RFIT=A+B*T+C*LOG(1+T). SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE. PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED, WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P), WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.) SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TC= 15 DEGREES CELSIUS). VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.3

SHOCK FRONT DATA   DIPOLE WEST/10 WES/295   SMOKE PUFF GRID 1209   R4 /A770322

MACH STEM BELOW INTERACTION PLANE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION #2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
4.447	8.020	8.007	-0.013	0.531	0.992	3.835	15.992	1509.384	2.979	4.478	7
7.407	11.134	11.284	0.149	0.885	1.398	2.816	8.083	763.359	2.051	3.690	19
10.351	13.838	13.845	0.007	1.237	1.715	2.329	5.163	487.257	1.583	3.122	32
10.351	13.761	13.845	0.084	1.237	1.715	2.329	5.163	487.257	1.583	3.122	31
13.308	16.534	16.027	-0.507	1.589	1.986	2.043	3.705	349.701	1.295	2.731	45
13.308	16.059	16.027	-0.032	1.589	1.986	2.043	3.705	349.701	1.295	2.731	43
13.308	16.329	16.027	-0.302	1.589	1.986	2.043	3.705	349.701	1.295	2.731	44
17.130	18.411	18.521	0.110	2.045	2.295	1.811	2.661	251.168	1.049	2.377	57
17.130	18.258	18.521	0.263	2.045	2.295	1.811	2.661	251.168	1.049	2.377	55
17.130	18.275	18.521	0.247	2.045	2.295	1.811	2.661	251.168	1.049	2.377	56
20.940	21.074	20.766	-0.308	2.501	2.573	1.660	2.050	193.467	0.882	2.133	70
20.940	20.437	20.766	0.329	2.501	2.573	1.660	2.050	193.467	0.882	2.133	67
20.940	20.547	20.766	0.219	2.501	2.573	1.660	2.050	193.467	0.882	2.133	68
20.940	20.601	20.766	0.165	2.501	2.573	1.660	2.050	193.467	0.882	2.133	69
24.155	22.727	22.530	-0.197	2.884	2.791	1.569	1.704	160.829	0.776	1.979	81
24.155	22.673	22.530	-0.143	2.884	2.791	1.569	1.704	160.829	0.776	1.979	79
24.155	22.572	22.530	-0.042	2.884	2.791	1.569	1.704	160.829	0.776	1.979	80
27.944	24.598	24.497	-0.101	3.337	3.035	1.487	1.412	133.240	0.678	1.839	94
27.944	24.442	24.497	0.056	3.337	3.035	1.487	1.412	133.240	0.678	1.839	91
27.944	24.608	24.497	-0.110	3.337	3.035	1.487	1.412	133.240	0.678	1.839	92
27.944	24.434	24.497	0.063	3.337	3.035	1.487	1.412	133.240	0.678	1.839	93
30.851	25.957	25.943	-0.015	3.684	3.214	1.437	1.242	117.245	0.618	1.754	105
30.851	25.848	25.943	0.094	3.684	3.214	1.437	1.242	117.245	0.618	1.754	103
30.851	25.961	25.943	-0.018	3.684	3.214	1.437	1.242	117.245	0.618	1.754	104

T IS TIME-OF-ARRIVAL AND R IS RADIAL PUFF POSITION. RADIUS VALUES ARE FITTED USING RFIT=A+B*T+C*LOG(1+T).
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED,
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TC= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.4

SHOCK FRONT DATA   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   R5 /A770322

MACH STEM ABOVE INTERACTION PLANE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION *2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
4.447	8.038	8.025	-0.014	0.531	0.994	3.845	16.085	1518.099	2.988	4.484	6
6.816	10.888	10.722	-0.166	0.814	1.328	2.955	9.018	851.177	2.180	3.815	18
10.351	13.726	13.853	0.127	1.237	1.716	2.315	5.088	480.259	1.570	3.105	30
10.361	13.866	13.853	-0.013	1.237	1.715	2.315	5.088	480.259	1.570	3.105	29
13.308	15.970	16.019	0.049	1.589	1.985	2.025	3.619	341.532	1.276	2.704	42
13.308	16.204	16.019	-0.185	1.589	1.985	2.025	3.619	341.532	1.276	2.704	40
13.308	15.985	16.019	0.034	1.589	1.985	2.025	3.619	341.532	1.276	2.704	41
17.130	18.199	18.487	0.289	2.046	2.290	1.789	2.569	242.473	1.025	2.342	54
17.130	18.436	18.487	0.052	2.046	2.290	1.789	2.569	242.473	1.025	2.342	51
17.130	18.232	18.487	0.255	2.046	2.290	1.789	2.569	242.473	1.025	2.342	52
17.130	18.173	18.487	0.314	2.046	2.290	1.789	2.569	242.473	1.025	2.342	53
20.940	20.394	20.702	0.308	2.501	2.565	1.636	1.956	184.634	0.854	2.092	66
20.940	20.940	20.702	-0.239	2.501	2.565	1.636	1.956	184.634	0.854	2.092	62
20.940	20.591	20.702	0.111	2.501	2.565	1.636	1.956	184.634	0.854	2.092	63
20.940	20.549	20.702	0.153	2.501	2.565	1.636	1.955	184.634	0.854	2.092	64
20.940	20.443	20.702	0.259	2.501	2.565	1.636	1.955	184.634	0.854	2.092	65
24.155	22.498	22.438	-0.060	2.884	2.780	1.543	1.610	151.990	0.746	1.935	78
24.155	23.372	22.438	-0.934	2.884	2.780	1.543	1.610	151.990	0.746	1.935	73
24.155	22.874	22.438	-0.436	2.884	2.780	1.543	1.610	151.990	0.746	1.935	74
24.155	22.774	22.438	-0.336	2.884	2.780	1.543	1.610	151.990	0.746	1.935	75
24.155	22.709	22.438	-0.271	2.884	2.780	1.543	1.610	151.990	0.746	1.935	76
24.155	22.625	22.438	-0.187	2.884	2.780	1.543	1.610	151.990	0.746	1.935	77
27.944	24.305	24.371	0.066	3.337	3.019	1.460	1.319	124.448	0.645	1.793	90
27.944	24.251	24.371	0.120	3.337	3.019	1.460	1.319	124.448	0.645	1.793	89
29.689	25.437	25.229	-0.209	3.545	3.126	1.428	1.213	114.448	0.607	1.738	65
29.689	25.054	25.229	0.174	3.545	3.126	1.428	1.213	114.448	0.607	1.738	87
29.689	24.804	25.229	0.424	3.545	3.126	1.428	1.213	114.448	0.607	1.738	88
29.689	25.091	25.229	0.138	3.545	3.126	1.428	1.213	114.448	0.607	1.738	86
30.851	25.812	25.789	-0.023	3.684	3.195	1.409	1.150	108.504	0.583	1.705	102
30.851	26.072	25.789	-0.282	3.684	3.195	1.409	1.150	108.504	0.583	1.705	101
32.012	26.177	26.343	0.166	3.823	3.264	1.391	1.092	103.053	0.561	1.675	100
32.882	26.806	26.753	-0.053	3.927	3.314	1.379	1.052	99.255	0.545	1.653	97
32.882	26.579	26.753	0.173	3.927	3.314	1.379	1.052	99.255	0.545	1.653	99
32.882	26.560	26.753	0.193	3.927	3.314	1.379	1.052	99.255	0.545	1.653	98

T IS TIME-OF-ARRIVAL AND R IS RADIAL PUFF POSITION. RADIUS VALUES ARE FITTED USING RFIT=A+B*T+C*LOG(1+T). SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE. PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED, WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P), WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)

TABLE 5.5

SHOCK FRONT DATA   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   R3 /A770322

MACH STEM AT GROUND SURFACE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION #2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
9.294	11.124	11.175	0.050	0.990	1.384	2.868	8.426	795.298	2.099	3.731	24
11.246	13.575	13.788	0.213	1.343	1.708	2.380	5.445	513.866	1.634	3.188	36
14.191	15.915	16.014	0.099	1.695	1.984	2.083	3.896	367.742	1.336	2.788	48
14.191	16.730	16.014	-0.715	1.695	1.984	2.083	3.896	367.742	1.336	2.788	46
14.191	16.072	16.014	-0.057	1.695	1.984	2.083	3.896	367.742	1.336	2.788	47
17.423	17.973	18.178	0.206	2.081	2.252	1.866	2.897	273.433	1.109	2.464	60
17.423	17.991	18.178	0.188	2.081	2.252	1.866	2.897	273.433	1.109	2.464	59
17.717	18.483	18.364	-0.119	2.116	2.275	1.850	2.828	265.894	1.092	2.439	58
20.940	20.050	20.308	0.258	2.501	2.516	1.703	2.217	209.224	0.930	2.203	72
20.940	20.331	20.308	-0.023	2.501	2.516	1.703	2.217	209.224	0.930	2.203	71
24.447	22.624	22.267	-0.358	2.919	2.759	1.585	1.764	166.520	0.795	2.007	82
24.739	22.202	22.424	0.222	2.954	2.778	1.577	1.733	163.607	0.785	1.992	84
24.739	22.377	22.424	0.047	2.954	2.778	1.577	1.733	163.607	0.785	1.992	83
28.526	24.062	24.393	0.331	3.406	3.022	1.483	1.399	132.078	0.674	1.833	96
28.526	24.453	24.393	-0.060	3.406	3.022	1.483	1.399	132.078	0.674	1.833	95
30.851	25.993	25.547	-0.445	3.684	3.165	1.437	1.241	117.153	0.617	1.753	106
31.432	25.681	25.830	0.149	3.753	3.200	1.426	1.206	113.825	0.604	1.735	108
31.432	25.813	25.830	0.017	3.753	3.200	1.426	1.206	113.825	0.604	1.735	107

T IS TIME-OF-ARRIVAL AND R IS RADIAL PUFF POSITION. RADIUS VALUES ARE FITTED USING RFIT=A+B*T+C*LOG(1+T).
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED,
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P).
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TC= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 6.1

PEAK VELOCITIES DIPOLE WEST/10 WES/295 SMOKE PUFF GRID 1209 /A770322

PRIMARY FRONT FROM LOWER CHARGE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.006 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION *2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

PEAK PARTICLE VELOCITY DATA, BY EXTRAPOLATION

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
3.665	7.897	0.440	0.977	2.010
4.187	8.367	0.500	1.037	2.161
4.505	8.662	0.538	1.073	2.526
4.999	9.109	0.597	1.129	2.386
5.025	9.132	0.600	1.131	2.379
5.527	9.572	0.660	1.186	2.237
5.862	9.859	0.700	1.221	2.143
6.063	10.029	0.724	1.242	2.086
6.669	10.554	0.800	1.307	1.879
6.967	10.769	0.832	1.334	1.586
7.537	11.218	0.900	1.390	1.548
8.374	11.857	1.000	1.469	1.542
9.212	12.471	1.100	1.545	1.463
10.007	13.034	1.195	1.615	1.449
10.049	13.064	1.200	1.618	1.447
10.886	13.636	1.300	1.689	1.413
11.724	14.191	1.400	1.758	1.138
11.925	14.321	1.424	1.774	1.183
12.561	14.729	1.500	1.825	1.274
13.097	15.065	1.564	1.866	1.359
13.399	15.251	1.600	1.889	1.384
14.236	15.760	1.700	1.952	1.391
14.446	15.935	1.725	1.968	1.386
15.074	16.255	1.800	2.014	1.220
15.911	16.738	1.900	2.074	1.148
15.749	17.210	2.000	2.132	0.861
16.916	17.303	2.020	2.144	0.849
17.585	17.671	2.100	2.189	0.804
18.423	18.122	2.200	2.245	0.749
19.261	18.564	2.300	2.300	0.696
20.098	18.997	2.400	2.353	0.577
20.936	19.422	2.500	2.406	0.538
21.053	19.480	2.514	2.413	0.533
21.773	19.838	2.600	2.458	0.502
22.610	20.248	2.700	2.508	0.468
23.448	20.650	2.800	2.558	0.438
24.285	21.046	2.900	2.607	0.410
25.123	21.436	3.000	2.656	0.384
25.960	21.819	3.100	2.703	0.361
26.797	22.197	3.200	2.750	0.340
27.635	22.569	3.300	2.796	0.324
28.472	22.937	3.400	2.842	0.322
28.581	22.984	3.413	2.847	0.320
29.310	23.299	3.500	2.886	0.320
30.147	23.656	3.600	2.931	0.320
30.985	24.009	3.700	2.974	0.319
31.822	24.358	3.800	3.018	0.319
32.659	24.703	3.900	3.060	0.318
33.497	25.043	4.000	3.103	0.317
34.334	25.380	4.100	3.144	0.315
35.172	25.713	4.200	3.186	0.313
36.009	26.042	4.300	3.226	0.310
36.847	26.368	4.400	3.267	0.305
37.684	26.691	4.500	3.307	0.300
38.312	26.931	4.575	3.336	0.293
38.521	27.011	4.600	3.346	0.288
39.359	27.327	4.700	3.386	0.286

R IS FITTED SHOCK RADIUS AT TIME T, CALCULATED FROM PARTICLE TRAJECTORY DATA.
VELOCITY IS EXPRESSED IN MACH UNITS RELATIVE TO THE AMBIENT SOUND SPEED C. AND
IS EXTRAPOLATED FROM VELOCITY VERSUS RADIUS DATA AT T, USING VFIT=A+B*E*RADIUS.

TABLE 6.2

PEAK VELOCITIES DIPOLE WEST/10 WF5/295 SMOKE PUFF GRID 1209 /A770322

PRIMARY FRONT FROM UPPER CHARGE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION #2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

PEAK PARTICLE VELOCITY DATA, BY EXTRAPOLATION

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY	T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
3.695	8.235	0.440	1.020	2.223	27.635	22.505	3.300	2.788	0.551
4.187	8.710	0.500	1.079	2.410	28.472	22.854	3.400	2.831	0.517
4.505	9.003	0.538	1.115	2.314	28.581	22.899	3.413	2.837	0.513
4.999	9.446	0.597	1.170	2.171	29.310	23.198	3.500	2.874	0.483
5.025	9.468	0.600	1.173	2.154	30.147	23.537	3.600	2.916	0.453
5.527	9.904	0.560	1.227	2.027	30.985	23.871	3.700	2.957	0.417
5.862	10.187	0.700	1.262	1.940	31.822	24.200	3.800	2.998	0.381
6.063	10.355	0.724	1.283	1.890	32.659	24.526	3.900	3.038	0.344
6.699	10.872	0.800	1.347	1.599	33.497	24.847	4.000	3.078	0.312
6.967	11.085	0.832	1.373	1.536	34.334	25.164	4.100	3.118	0.293
7.537	11.527	0.900	1.428	1.414	35.172	25.478	4.200	3.156	0.284
8.374	12.154	1.000	1.506	1.321	36.009	25.788	4.300	3.195	0.286
9.212	12.757	1.100	1.580	1.252	36.847	26.094	4.400	3.233	0.265
10.007	13.309	1.195	1.649	1.201	37.684	26.397	4.500	3.270	0.256
10.049	13.338	1.200	1.652	1.199	38.312	26.623	4.575	3.298	0.250
10.886	13.898	1.300	1.722	1.096	38.521	26.697	4.600	3.307	0.248
11.724	14.439	1.400	1.789	1.093	39.359	26.994	4.700	3.344	0.240
11.925	14.566	1.424	1.805	1.066	40.196	27.288	4.800	3.361	0.228
12.561	14.963	1.500	1.854	1.044	41.034	27.576	4.900	3.417	0.224
13.097	15.290	1.564	1.894	1.025	41.871	27.866	5.000	3.452	0.213
13.399	15.472	1.600	1.917	1.015	42.708	28.151	5.100	3.488	0.229
14.235	15.966	1.700	1.978	1.052	43.546	28.434	5.200	3.523	0.251
14.446	16.087	1.725	1.993	1.042	44.383	28.714	5.300	3.557	0.273
15.074	16.446	1.800	2.037	1.014	45.221	28.991	5.400	3.592	0.296
15.911	16.914	1.900	2.095	0.973	46.058	29.266	5.500	3.626	0.317
16.748	17.370	2.000	2.152	0.931	46.896	29.539	5.600	3.660	0.333
16.916	17.460	2.020	2.163	0.923	47.733	29.809	5.700	3.693	0.322
17.585	17.815	2.100	2.207	0.889	48.570	30.078	5.800	3.726	0.330
18.423	18.250	2.200	2.261	0.941	49.408	30.344	5.900	3.759	0.337
19.261	18.676	2.300	2.314	0.902	49.559	30.392	5.918	3.765	0.338
20.099	19.092	2.400	2.365	0.861	50.245	30.608	6.000	3.792	0.345
20.936	19.500	2.500	2.416	0.820	51.083	30.870	6.100	3.824	0.354
21.053	19.556	2.514	2.423	0.814	51.920	31.130	6.200	3.857	0.361
21.773	19.899	2.600	2.465	0.788	52.757	31.388	6.300	3.889	0.316
22.610	20.291	2.700	2.514	0.754	53.595	31.645	6.400	3.920	0.288
23.448	20.676	2.800	2.562	0.718	54.432	31.899	6.500	3.952	0.247
24.285	21.055	2.900	2.608	0.683	55.270	32.152	6.600	3.983	0.208
25.123	21.426	3.000	2.654	0.650	56.107	32.403	6.700	4.014	0.216
25.960	21.792	3.100	2.700	0.619	56.945	32.653	6.800	4.045	0.272
26.797	22.151	3.200	2.744	0.595	57.782	32.901	6.900	4.076	0.342

R IS FITTED SHOCK RADIUS AT TIME T, CALCULATED FROM PARTICLE TRAJECTORY DATA.
VELOCITY IS EXPRESSED IN MACH UNITS RELATIVE TO THE AMBIENT SOUND SPEED C, AND
IS EXTRAPOLATED FROM VELOCITY VERSUS RADIUS DATA AT T, USING VFIT=A+B*B*RADIUS.

TABLE 6.3

PEAK VELOCITIES   DIPOLE WEST/10   WES/295   SMOKE PUFF GRID 1209   /A770322

MACH STEM BELOW INTERACTION PLANE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 459.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION *2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

PEAK PARTICLE VELOCITY DATA, BY EXTRAPOLATION

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
4.505	8.256	0.538	1.023	2.164
4.999	8.793	0.597	1.089	2.029
5.025	8.819	0.600	1.093	2.023
5.527	9.347	0.660	1.158	1.934
5.862	9.690	0.700	1.201	1.985
6.063	9.893	0.724	1.226	1.955
6.699	10.519	0.800	1.303	1.760
6.967	10.776	0.832	1.335	1.720
7.537	11.309	0.900	1.401	2.223
8.374	12.065	1.000	1.495	1.847
9.212	12.790	1.100	1.565	1.745
10.007	13.453	1.195	1.667	1.659
10.049	13.488	1.200	1.671	1.655
10.886	14.159	1.300	1.754	1.607
11.724	14.808	1.400	1.834	1.541
11.925	14.960	1.424	1.853	1.527
12.561	15.435	1.500	1.912	1.491
13.097	15.826	1.564	1.961	1.443
13.399	16.042	1.600	1.987	1.231
14.236	16.631	1.700	2.060	1.205
14.446	16.776	1.725	2.078	1.199
15.074	17.203	1.800	2.131	1.180
15.911	17.760	1.900	2.200	1.153
16.749	18.301	2.000	2.267	1.124
16.915	18.408	2.020	2.281	1.118
17.586	18.829	2.100	2.333	1.166
18.423	19.344	2.200	2.397	1.119
19.261	19.848	2.300	2.459	1.077
20.098	20.339	2.400	2.520	1.033
20.936	20.820	2.500	2.579	0.988
21.053	20.887	2.514	2.588	0.938
21.773	21.292	2.600	2.638	0.961
22.610	21.753	2.700	2.695	0.928
23.448	22.206	2.800	2.751	0.893
24.285	22.650	2.900	2.806	0.813
25.123	23.086	3.000	2.860	0.795
25.960	23.514	3.100	2.913	0.774
26.797	23.935	3.200	2.965	0.750
27.635	24.349	3.300	3.016	0.725
28.472	24.756	3.400	3.067	0.737
28.581	24.808	3.413	3.073	0.734
29.310	25.157	3.500	3.117	0.712
30.147	25.551	3.600	3.166	0.686
30.985	25.940	3.700	3.214	0.693
31.822	26.324	3.800	3.261	0.673
32.659	26.702	3.900	3.308	0.652
33.497	27.075	4.000	3.354	0.629
34.334	27.443	4.100	3.400	0.606
35.172	27.806	4.200	3.445	0.582
36.009	28.164	4.300	3.489	0.559
36.847	28.519	4.400	3.533	0.536
37.684	28.869	4.500	3.576	0.514
38.312	29.128	4.575	3.609	0.499
38.521	29.215	4.600	3.619	0.494
39.359	29.557	4.700	3.662	0.476
40.196	29.895	4.800	3.704	0.463
41.034	30.229	4.900	3.745	0.450
41.871	30.560	5.000	3.786	0.440
42.708	30.888	5.100	3.827	0.432
43.546	31.212	5.200	3.867	0.427
44.383	31.533	5.300	3.907	0.425
45.221	31.851	5.400	3.946	0.423
46.058	32.166	5.500	3.985	0.426
46.896	32.478	5.600	4.024	0.426
47.733	32.788	5.700	4.062	0.431
48.570	33.094	5.800	4.100	0.431
49.408	33.398	5.900	4.138	0.427
49.559	33.452	5.918	4.144	0.426
50.245	33.699	6.000	4.175	0.422
51.083	33.999	6.100	4.212	0.415
51.920	34.294	6.200	4.249	0.401
52.757	34.588	6.300	4.285	0.386
53.595	34.879	6.400	4.321	0.362
54.432	35.169	6.500	4.357	0.336
55.270	35.456	6.600	4.393	0.296
56.107	35.741	6.700	4.428	0.243
56.945	36.024	6.800	4.463	0.168
57.782	36.305	6.900	4.498	0.148

R IS FITTED SHOCK RADIUS AT TIME T, CALCULATED FROM PARTICLE TRAJECTORY DATA.
VELOCITY IS EXPRESSED IN MACH UNITS RELATIVE TO THE AMBIENT SOUND SPEED C, AND
IS EXTRAPOLATED FROM VELOCITY VERSUS RADIUS DATA AT T, USING VFIT=A+B*E*RADIUS.

TABLE 6.4

PEAK VELOCITIES   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

MACH STEM ABOVE INTERACTION PLANE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 4.55 METERS
SEPARATION +2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

PEAK PARTICLE VELOCITY DATA, BY EXTRAPOLATION

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
4.505	8.285	0.538	1.026	2.669
4.999	8.818	0.597	1.092	2.565
5.025	8.845	0.600	1.096	2.560
5.527	9.369	0.660	1.161	2.454
5.862	9.709	0.700	1.203	2.384
6.063	9.910	0.724	1.228	2.342
6.699	10.531	0.800	1.305	2.208
6.967	10.786	0.832	1.336	1.469
7.537	11.315	0.900	1.402	2.111
8.374	12.065	1.000	1.495	2.025
9.212	12.785	1.100	1.584	1.890
10.007	13.442	1.195	1.665	1.814
10.049	13.476	1.200	1.670	1.815
10.886	14.143	1.300	1.752	1.658
11.724	14.786	1.400	1.832	1.312
11.925	14.937	1.424	1.851	1.427
12.561	15.408	1.500	1.909	1.400
13.097	15.796	1.564	1.957	1.374
13.399	16.010	1.600	1.983	1.366
14.235	16.595	1.700	2.056	1.307
14.446	16.738	1.725	2.074	1.292
15.074	17.162	1.800	2.126	1.240
15.911	17.714	1.900	2.195	1.183
16.748	18.251	2.000	2.261	1.113
16.916	18.357	2.020	2.274	1.099
17.585	18.775	2.100	2.326	1.212
18.423	19.286	2.200	2.389	1.135
19.261	19.785	2.300	2.451	1.069
20.098	20.273	2.400	2.512	1.006
20.935	20.750	2.500	2.571	0.945
21.053	20.816	2.514	2.579	1.057
21.773	21.217	2.600	2.629	1.009
22.610	21.675	2.700	2.685	0.955
23.448	22.124	2.800	2.741	0.903
24.285	22.564	2.900	2.795	0.714
25.123	22.996	3.000	2.849	0.703
25.960	23.421	3.100	2.902	0.690
26.797	23.838	3.200	2.953	0.677
27.635	24.248	3.300	3.004	0.661

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
28.472	24.652	3.400	3.054	0.685
28.581	24.704	3.413	3.061	0.692
29.310	25.050	3.500	3.103	0.659
30.147	25.441	3.600	3.152	0.684
30.985	25.827	3.700	3.200	0.659
31.822	26.207	3.800	3.247	0.631
32.659	26.581	3.900	3.293	0.618
33.497	26.951	4.000	3.339	0.613
34.334	27.316	4.100	3.384	0.575
35.172	27.676	4.200	3.429	0.544
36.009	28.032	4.300	3.473	0.516
36.847	28.383	4.400	3.516	0.490
37.684	28.730	4.500	3.559	0.467
38.312	28.987	4.575	3.591	0.450
38.521	29.073	4.600	3.602	0.445
39.359	29.412	4.700	3.644	0.424
40.196	29.747	4.800	3.685	0.408
41.034	30.079	4.900	3.726	0.393
41.871	30.407	5.000	3.767	0.380
42.708	30.731	5.100	3.807	0.369
43.546	31.053	5.200	3.847	0.359
44.383	31.371	5.300	3.886	0.351
45.221	31.686	5.400	3.926	0.343
46.058	31.998	5.500	3.964	0.336
46.896	32.308	5.600	4.003	0.330
47.733	32.614	5.700	4.040	0.318
48.570	32.918	5.800	4.078	0.313
49.408	33.219	5.900	4.115	0.309
49.559	33.273	5.918	4.122	0.309
50.245	33.517	6.000	4.152	0.307
51.083	33.813	6.100	4.189	0.306
51.920	34.107	6.200	4.225	0.307
52.757	34.398	6.300	4.262	0.311
53.595	34.687	6.400	4.297	0.317
54.432	34.974	6.500	4.333	0.321
55.270	35.258	6.600	4.368	0.315
56.107	35.541	6.700	4.403	0.296
56.945	35.821	6.800	4.438	0.271
57.782	36.099	6.900	4.472	0.245

R IS FITTED SHOCK RADIUS AT TIME T, CALCULATED FROM PARTICLE TRAJECTORY DATA.
VELOCITY IS EXPRESSED IN MACH UNITS RELATIVE TO THE AMBIENT SOUND SPEED C, AND
IS EXTRAPOLATED FROM VELOCITY VERSUS RADIUS DATA AT T, USING VFIT=A+B*B*RADIUS.

TABLE 6.5

PEAK VELOCITIES   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

MACH STEM AT GROUND SURFACE

AMBIENT TEMPERATURE T= -5.94 DEGREES CELSIUS
AMBIENT PRESSURE P= 94.38 KILOPASCALS
RELATIVE HUMIDITY RH= 81.0 PER CENT
VAPOUR PRESSURE VP= 0.32 KILOPASCALS
AMBIENT SPEED OF SOUND C= 328.004 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS.
CHARGE HEIGHT H= 4.55 METERS
SEPARATION #2 HS= 4.64 METERS
SACHS SCALING FACTOR S= 8.0718
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

PEAK PARTICLE VELOCITY DATA, BY EXTRAPOLATION

T-OBS MSEC	R-OBS METERS	T-SCAL MSEC	R-SCAL METERS	PARTICLE VELOCITY
6.693	9.726	0.800	1.205	1.906
6.967	9.990	0.832	1.238	1.831
7.537	10.538	0.900	1.306	1.670
8.374	11.316	1.000	1.402	1.539
9.212	12.062	1.100	1.494	1.539
10.007	12.744	1.195	1.579	1.539
10.043	12.779	1.200	1.583	1.539
10.885	13.470	1.300	1.669	1.539
11.724	14.137	1.400	1.751	1.539
11.925	14.294	1.424	1.771	1.539
12.561	14.782	1.500	1.831	1.359
13.097	15.184	1.564	1.881	1.358
13.393	15.407	1.600	1.909	1.344
14.235	16.013	1.700	1.984	0.800
14.446	16.162	1.725	2.002	0.845
15.074	16.602	1.800	2.057	0.947
15.911	17.174	1.900	2.128	1.023
16.749	17.732	2.000	2.197	1.154
16.916	17.941	2.020	2.210	1.167
17.586	18.275	2.100	2.264	0.922
18.423	18.805	2.200	2.330	1.071
19.261	19.323	2.300	2.394	1.092
20.093	19.829	2.400	2.457	1.108
20.936	20.324	2.500	2.518	1.111
21.053	20.393	2.514	2.526	0.924
21.773	20.809	2.600	2.579	0.938
22.610	21.284	2.700	2.637	0.989
23.448	21.750	2.800	2.695	1.008
24.285	22.207	2.900	2.751	0.939
25.123	22.656	3.000	2.807	0.932
25.960	23.097	3.100	2.861	0.929
26.797	23.531	3.200	2.915	0.928
27.635	23.957	3.300	2.968	0.910
28.472	24.376	3.400	3.020	0.866
28.581	24.430	3.413	3.027	0.836
29.310	24.739	3.500	3.071	0.836
30.147	25.195	3.600	3.121	0.835
30.985	25.596	3.700	3.171	0.807
31.822	25.991	3.800	3.220	0.784
32.659	26.380	3.900	3.268	0.777
33.497	26.764	4.000	3.316	0.766
34.334	27.143	4.100	3.363	0.750
35.172	27.517	4.200	3.409	0.729
36.009	27.887	4.300	3.455	0.703
36.847	28.252	4.400	3.500	0.672
37.684	28.612	4.500	3.545	0.635
38.312	28.880	4.575	3.578	0.605
38.521	28.969	4.600	3.589	0.595
39.359	29.321	4.700	3.633	0.603
40.196	29.670	4.800	3.676	0.579
41.034	30.014	4.900	3.718	0.552
41.871	30.355	5.000	3.761	0.522
42.708	30.693	5.100	3.802	0.526
43.546	31.027	5.200	3.844	0.513
44.383	31.358	5.300	3.885	0.526
45.221	31.686	5.400	3.925	0.485
46.058	32.010	5.500	3.966	0.462
46.896	32.332	5.600	4.006	0.456
47.733	32.651	5.700	4.045	0.466
48.570	32.967	5.800	4.084	0.453
49.408	33.280	5.900	4.123	0.478
49.559	33.336	5.918	4.130	0.478
50.245	33.590	6.000	4.161	0.476
51.083	33.898	6.100	4.200	0.469
51.920	34.203	6.200	4.237	0.455
52.757	34.506	6.300	4.275	0.429
53.595	34.807	6.400	4.312	0.379
54.432	35.105	6.500	4.349	0.193
55.270	35.401	6.600	4.386	0.323
56.107	35.695	6.700	4.422	0.248
56.945	35.987	6.800	4.458	0.171
57.782	36.276	6.900	4.494	0.236

R IS FITTED SHOCK RADIUS AT TIME T, CALCULATED FROM PARTICLE TRAJECTORY DATA.
VELOCITY IS EXPRESSED IN MACH UNITS RELATIVE TO THE AMBIENT SOUND SPEED C, AND
IS EXTRAPOLATED FROM VELOCITY VERSUS RADIUS DATA AT T, USING VFIT=A+B*E*RADIUS.

TABLE 7.1

VELOCITY FIELD DIPOLE WEST/10 WFS/295 SMOKE PUFF GRID 1209 /A770322

PARTICLE VELOCITIES AT SCALED TIME= 0.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.022	1.995	2.21	0.43	2.255	1.061	2
1.043	1.792	2.08	0.21	2.091	1.046	2
1.064	1.618	2.03	-0.11	2.030	1.058	2
1.000	1.411	2.37	-0.45	2.410	1.045	2

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.013	0.876	1.72	0.22	1.731	1.060	1
1.012	0.718	1.96	0.20	1.971	1.024	1
1.032	0.486	1.85	-0.17	1.859	1.035	1
0.958	0.306	2.11	-0.46	2.161	0.992	1

PARTICLE VELOCITIES AT SCALED TIME= 0.600 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.064	2.202	1.94	0.76	2.078	1.171	2
1.094	2.011	1.98	0.41	2.023	1.133	2
1.110	1.799	1.88	0.21	1.888	1.114	2
1.130	1.615	1.85	-0.07	1.850	1.134	2
1.076	1.396	2.13	-0.38	2.164	1.122	2
1.053	1.238	2.54	0.29	2.560	1.057	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.036	1.054	1.96	0.45	2.009	1.039	4
1.072	0.887	1.75	0.39	1.791	1.120	1
1.078	0.725	1.89	0.22	1.906	1.090	1
1.093	0.480	1.76	-0.18	1.766	1.096	1
1.028	0.291	2.00	-0.41	2.042	1.063	1
0.981	0.100	2.30	-0.60	2.379	1.085	1

PARTICLE VELOCITIES AT SCALED TIME= 0.700 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.125	2.226	1.64	0.66	1.769	1.236	2
1.157	2.024	1.77	0.39	1.812	1.199	2
1.171	1.806	1.69	0.21	1.703	1.175	2
1.190	1.613	1.68	-0.05	1.684	1.194	2
1.145	1.385	1.92	-0.31	1.940	1.191	2
1.136	1.247	2.37	0.24	2.384	1.141	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.100	1.069	1.83	0.44	1.885	1.103	4
1.132	0.903	1.78	0.57	1.865	1.182	1
1.141	0.732	1.83	0.23	1.841	1.154	1
1.152	0.474	1.67	-0.18	1.677	1.155	1
1.094	0.278	1.89	-0.37	1.924	1.130	1
1.055	0.081	2.08	-0.53	2.143	1.160	1

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.2

VELOCITY FIELD DIPOLE WEST/10 WFS/295 SMOKE PUFF GRID 1209 /A770322

PARTICLE VELOCITIES AT SCALED TIME= 0.800 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.176	2.247	1.39	0.59	1.510	1.292	2
1.214	2.037	1.58	0.37	1.621	1.257	2
1.226	1.813	1.52	0.21	1.535	1.230	2
1.245	1.612	1.53	-0.02	1.532	1.249	2
1.207	1.375	1.72	-0.25	1.738	1.253	2
1.214	1.254	2.20	0.19	2.208	1.220	5
1.161	1.034	1.71	0.43	1.760	1.162	4
1.194	0.918	1.86	-0.26	1.879	1.245	1

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.202	0.740	1.76	0.24	1.776	1.215	1
1.207	0.468	1.58	-0.18	1.590	1.211	1
1.156	0.266	1.78	-0.32	1.806	1.194	1
1.122	0.064	1.85	-0.46	1.906	1.124	3
1.344	1.952	1.39	0.30	1.421	1.366	2
1.347	1.753	1.58	0.09	1.579	1.348	2
1.336	1.581	1.77	-0.03	1.771	1.342	2

PARTICLE VELOCITIES AT SCALED TIME= 0.900 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.220	2.266	1.19	0.52	1.294	1.339	2
1.265	2.049	1.41	0.35	1.450	1.309	2
1.275	1.820	1.37	0.21	1.384	1.279	2
1.294	1.611	1.39	-0.00	1.393	1.298	2
1.262	1.369	1.54	-0.20	1.555	1.283	5
1.286	1.260	2.03	0.15	2.033	1.292	5
1.217	1.098	1.58	0.41	1.636	1.217	4
1.253	0.910	1.66	-0.19	1.669	1.274	4
1.255	0.734	1.49	-0.25	1.516	1.267	1
1.259	0.462	1.50	-0.18	1.506	1.263	1
1.215	0.256	1.67	-0.28	1.689	1.253	1
1.181	0.049	1.62	-0.39	1.670	1.182	3

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.351	2.181	1.26	0.45	1.342	1.430	2
1.390	1.962	1.29	0.29	1.325	1.412	2
1.399	1.756	1.44	0.10	1.447	1.399	2
1.393	1.581	1.60	-0.00	1.602	1.399	2
1.371	1.411	1.37	0.08	1.371	1.398	5
1.391	1.259	2.07	0.43	2.111	1.396	5
1.387	1.036	2.18	-0.41	2.220	1.391	4
1.378	0.846	1.73	-0.13	1.733	1.407	1
1.376	0.667	1.61	-0.04	1.607	1.380	1
1.367	0.478	1.61	-0.12	1.613	1.369	1
1.332	0.308	1.58	-0.22	1.598	1.356	1

PARTICLE VELOCITIES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.257	2.283	1.02	0.47	1.118	1.380	2
1.310	2.061	1.25	0.33	1.296	1.356	2
1.319	1.827	1.23	0.20	1.249	1.324	2
1.340	1.611	1.27	0.02	1.266	1.344	2
1.312	1.362	1.38	-0.15	1.391	1.331	5
1.352	1.264	1.86	0.10	1.858	1.358	5
1.268	1.112	1.46	0.40	1.512	1.269	4
1.307	0.905	1.48	-0.13	1.481	1.327	4
1.305	0.726	1.38	-0.20	1.390	1.315	1
1.309	0.456	1.41	-0.17	1.424	1.313	1
1.269	0.247	1.55	-0.23	1.571	1.308	1
1.392	2.196	1.17	0.41	1.246	1.474	2

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.433	1.972	1.20	0.27	1.235	1.456	2
1.446	1.760	1.32	0.11	1.326	1.446	2
1.445	1.581	1.45	0.01	1.448	1.451	2
1.424	1.416	1.62	0.12	1.622	1.451	5
1.465	1.273	2.12	0.32	2.142	1.471	5
1.459	1.023	2.01	-0.35	2.036	1.463	4
1.434	0.842	1.57	-0.10	1.575	1.464	4
1.429	0.666	1.50	-0.05	1.504	1.433	1
1.420	0.474	1.53	-0.12	1.538	1.423	1
1.385	0.301	1.51	-0.22	1.522	1.409	1
1.379	0.101	1.54	-0.07	1.539	1.383	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.3

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIFS AT SCALED TIME= 1.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.385	2.347	0.58	0.31	0.658	1.523	2
1.473	2.109	0.71	0.25	0.755	1.525	2
1.483	1.860	0.74	0.18	0.764	1.490	2
1.511	1.620	0.79	0.08	0.795	1.514	2
1.494	1.351	0.81	-0.00	0.807	1.509	5
1.463	1.175	0.83	0.33	0.899	1.464	5
1.497	0.905	0.83	0.10	0.839	1.516	4
1.497	0.709	0.91	-0.01	0.915	1.504	1
1.517	0.432	1.05	-0.12	1.059	1.523	1
1.486	0.227	1.00	-0.01	0.996	1.524	1
1.560	2.254	0.82	0.29	0.868	1.651	2
1.605	2.013	0.84	0.21	0.871	1.633	2
1.628	1.781	0.85	0.13	0.864	1.629	2
1.638	1.538	0.87	0.07	0.871	1.642	2
1.737	0.982	1.31	-0.15	1.321	1.744	4
1.647	0.836	0.99	0.02	0.986	1.675	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.647	0.656	1.07	-0.06	1.077	1.649	1
1.650	0.456	1.17	-0.09	1.178	1.653	1
1.610	0.266	1.15	-0.18	1.169	1.638	1
1.727	2.203	0.83	0.19	0.852	1.795	2
1.758	1.998	0.95	0.14	0.963	1.781	2
1.764	1.789	1.13	0.16	1.139	1.786	2
1.775	1.621	1.13	0.20	1.148	1.839	5
1.837	1.441	1.39	0.28	1.419	1.862	5
1.836	1.252	1.39	0.13	1.398	1.840	5
1.841	1.035	1.40	-0.13	1.406	1.844	4
1.817	0.830	1.30	-0.31	1.334	1.843	4
1.788	0.666	1.31	-0.27	1.339	1.850	4
1.769	0.493	1.18	-0.02	1.183	1.770	1
1.761	0.298	1.25	-0.05	1.249	1.786	3
1.747	0.110	1.36	0.00	1.359	1.751	3

PARTICLE VELOCITIES AT SCALED TIME= 1.600 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.404	2.357	0.55	0.30	0.623	1.545	2
1.496	2.113	0.64	0.24	0.684	1.550	2
1.507	1.866	0.68	0.17	0.700	1.515	2
1.537	1.623	0.72	0.08	0.728	1.540	2
1.520	1.351	0.73	0.02	0.729	1.534	5
1.490	1.186	0.71	0.32	0.779	1.490	5
1.524	0.909	0.75	0.13	0.760	1.541	4
1.526	0.709	0.85	0.01	0.846	1.533	1
1.552	0.428	0.99	-0.10	0.994	1.558	1
1.513	0.227	0.88	0.04	0.885	1.555	1
1.587	2.263	0.76	0.27	0.810	1.680	2
1.633	2.020	0.79	0.21	0.814	1.661	2
1.656	1.765	0.79	0.13	0.796	1.657	2
1.665	1.591	0.79	0.07	0.789	1.670	2
1.779	0.978	1.21	-0.12	1.213	1.787	4
1.680	0.837	0.90	0.04	0.903	1.706	4
1.682	0.654	1.00	-0.06	1.006	1.684	1
1.689	0.453	1.11	-0.08	1.111	1.692	1
1.648	0.260	1.09	-0.17	1.104	1.676	1

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.754	2.210	0.81	0.21	0.834	1.824	2
1.789	2.003	0.90	0.17	0.911	1.813	2
1.821	1.795	1.03	0.17	1.047	1.823	2
1.814	1.627	1.14	0.16	1.146	1.878	5
1.883	1.450	1.26	0.25	1.288	1.908	5
1.882	1.256	1.28	0.11	1.286	1.885	5
1.887	1.031	1.30	-0.11	1.302	1.890	4
1.860	0.820	1.23	-0.28	1.259	1.887	4
1.831	0.658	1.21	-0.23	1.231	1.893	4
1.812	0.491	1.29	-0.12	1.300	1.813	1
1.803	0.296	1.18	-0.09	1.182	1.827	3
1.794	0.110	1.34	-0.05	1.344	1.797	3
1.959	1.599	1.29	0.38	1.347	2.012	5
1.966	1.419	1.44	0.25	1.466	1.986	5
1.982	1.222	1.34	0.14	1.346	1.983	5
1.993	1.048	1.41	-0.31	1.446	1.995	4
2.008	0.860	1.09	-0.26	1.124	2.027	4
1.999	0.674	0.94	-0.25	0.970	2.052	4

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.4

VELOCITY FIELD   DIPOLE WEST/10   WES/293   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 1.700 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.422	2.367	0.53	0.29	0.598	1.565	2
1.517	2.126	0.58	0.23	0.624	1.572	2
1.529	1.872	0.62	0.17	0.644	1.537	2
1.561	1.625	0.66	0.09	0.669	1.563	2
1.543	1.352	0.66	0.03	0.661	1.558	5
1.512	1.196	0.59	0.31	0.661	1.513	5
1.549	0.914	0.68	0.16	0.694	1.565	4
1.554	0.710	0.78	0.03	0.734	1.561	1
1.585	0.425	0.93	-0.09	0.932	1.591	1
1.547	0.229	0.77	0.08	0.777	1.582	1
1.612	2.272	0.71	0.26	0.757	1.706	2
1.659	2.027	0.73	0.20	0.760	1.698	2
1.681	1.789	0.72	0.13	0.735	1.693	2
1.691	1.593	0.71	0.07	0.717	1.696	2
1.819	0.974	1.11	-0.09	1.116	1.826	4
1.709	0.839	0.83	0.06	0.829	1.735	4
1.715	0.652	0.94	-0.05	0.940	1.717	1
1.725	0.450	1.04	-0.07	1.045	1.729	1
1.684	0.254	1.03	-0.16	1.041	1.704	3
1.782	2.218	0.78	0.22	0.813	1.852	2
1.819	2.009	0.84	0.18	0.861	1.843	2
1.855	1.801	0.94	0.18	0.962	1.857	2

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.852	1.632	1.11	0.12	1.113	1.917	5
1.924	1.458	1.15	0.22	1.168	1.950	5
1.923	1.259	1.18	0.08	1.180	1.927	5
1.929	1.028	1.20	-0.09	1.205	1.933	4
1.900	0.811	1.16	-0.26	1.187	1.928	4
1.871	0.651	1.12	-0.19	1.131	1.933	4
1.856	0.485	1.27	-0.20	1.286	1.857	1
1.842	0.292	1.11	-0.11	1.118	1.865	3
1.838	0.107	1.27	-0.09	1.268	1.841	3
1.939	2.162	0.88	0.14	0.894	1.991	2
1.939	1.975	1.14	0.15	1.149	1.957	2
1.938	1.781	1.15	0.35	1.206	1.939	2
2.001	1.612	1.21	0.36	1.259	2.057	5
2.013	1.427	1.33	0.22	1.344	2.033	5
2.026	1.227	1.25	0.14	1.257	2.028	5
2.039	1.038	1.31	-0.25	1.335	2.041	4
2.045	0.852	1.08	-0.24	1.109	2.065	4
2.031	0.666	0.96	-0.25	0.988	2.085	4
2.018	0.474	0.29	-0.06	0.294	2.073	3
1.971	0.287	0.46	0.04	0.462	1.992	3
1.970	0.109	0.59	-0.24	0.634	1.973	3

PARTICLE VELOCITIES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.474	2.395	0.50	0.26	0.567	1.624	2
1.569	2.147	0.45	0.19	0.492	1.628	2
1.585	1.889	0.50	0.15	0.519	1.595	2
1.621	1.635	0.52	0.10	0.530	1.622	2
1.602	1.356	0.51	0.05	0.512	1.617	5
1.609	0.933	0.52	0.21	0.560	1.622	4
1.625	0.716	0.63	0.08	0.636	1.633	1
1.671	0.418	0.76	-0.04	0.762	1.677	1
1.678	2.297	0.59	0.23	0.627	1.777	2
1.727	2.046	0.60	0.17	0.625	1.758	2
1.747	1.802	0.57	0.12	0.587	1.749	2
1.755	1.601	0.54	0.07	0.548	1.815	5
1.920	0.968	0.88	-0.03	0.879	1.927	4
1.784	0.847	0.65	0.10	0.658	1.907	4
1.802	0.648	0.77	-0.03	0.766	1.867	4
1.822	0.444	0.86	-0.05	0.861	1.826	1
1.780	0.240	0.85	-0.12	0.863	1.796	3
1.857	2.241	0.69	0.23	0.733	1.931	2
1.957	2.029	0.70	0.21	0.729	1.923	2
1.939	1.820	0.73	0.19	0.749	1.942	2
1.952	1.640	0.80	0.04	0.802	2.015	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.025	1.478	0.86	0.17	0.877	2.054	5
2.029	1.265	0.90	0.03	0.902	2.033	5
2.039	1.020	0.96	-0.05	0.957	2.042	4
2.009	0.788	0.97	-0.19	0.989	2.039	4
1.972	0.637	0.88	-0.09	0.881	2.035	4
1.974	0.462	1.07	-0.17	1.065	2.028	3
1.946	0.280	0.93	-0.14	0.941	1.966	3
1.951	0.097	0.97	-0.10	0.974	1.954	3
2.024	2.180	0.78	0.21	0.804	2.077	2
2.042	1.953	0.89	0.20	0.914	2.061	2
2.043	1.810	0.91	0.23	0.935	2.045	2
2.113	1.644	0.99	0.28	1.026	2.173	5
2.132	1.446	1.03	0.15	1.040	2.154	5
2.141	1.240	1.01	0.12	1.016	2.143	5
2.159	1.019	1.05	-0.14	1.056	2.162	4
2.153	0.831	1.02	-0.18	1.034	2.174	4
2.129	0.641	0.96	-0.23	0.988	2.187	4
2.093	0.454	0.98	-0.26	1.015	2.142	3
2.069	0.297	1.16	0.02	1.165	2.050	3
2.063	0.097	1.08	-0.04	1.084	2.065	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.5

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 2.100 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.491	2.404	0.50	0.26	0.562	1.644	2
1.584	2.154	0.42	0.19	0.452	1.644	2
1.602	1.893	0.47	0.14	0.490	1.612	2
1.638	1.639	0.49	0.10	0.435	1.639	2
1.619	1.358	0.47	0.06	0.475	1.634	5
1.626	0.940	0.48	0.22	0.532	1.638	4
1.647	0.719	0.59	0.09	0.597	1.654	1
1.695	0.417	0.71	-0.02	0.712	1.702	1
1.697	2.305	0.55	0.23	0.591	1.797	2
1.746	2.051	0.56	0.16	0.588	1.779	2
1.766	1.806	0.54	0.12	0.548	1.768	2
1.773	1.603	0.50	0.07	0.506	1.833	5
1.949	0.969	0.82	-0.01	0.816	1.956	4
1.805	0.851	0.61	0.11	0.615	1.828	4
1.827	0.647	0.72	-0.02	0.716	1.892	4
1.851	0.442	0.80	-0.04	0.804	1.855	1
1.809	0.236	0.80	-0.11	0.808	1.824	3
1.880	2.249	0.66	0.23	0.702	1.955	2
1.920	2.036	0.66	0.21	0.689	1.947	2
1.963	1.826	0.67	0.18	0.691	1.966	2
1.976	1.641	0.63	0.03	0.628	2.039	5
2.053	1.484	0.79	0.15	0.801	2.082	5
2.059	1.266	0.82	0.02	0.823	2.062	5
2.070	1.019	0.89	-0.04	0.887	2.074	4
2.041	0.782	0.91	-0.17	0.929	2.072	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.000	0.534	0.81	-0.06	0.812	2.063	4
2.010	0.458	1.02	-0.09	1.024	2.061	3
1.976	0.275	0.88	-0.14	0.886	1.995	3
1.983	0.094	0.91	-0.10	0.914	1.985	3
2.050	2.187	0.74	0.23	0.775	2.104	2
2.071	2.000	0.82	0.21	0.849	2.091	2
2.072	1.817	0.84	0.20	0.861	2.075	2
2.145	1.654	0.92	0.26	0.958	2.206	5
2.166	1.450	0.95	0.13	0.956	2.188	5
2.174	1.244	0.94	0.11	0.944	2.176	5
2.193	1.015	0.97	-0.11	0.978	2.197	4
2.187	0.825	0.99	-0.16	1.001	2.209	4
2.162	0.634	0.95	-0.22	0.974	2.220	4
2.127	0.446	1.01	-0.26	1.047	2.173	3
2.108	0.296	1.12	-0.09	1.127	2.129	3
2.100	0.096	1.10	-0.03	1.097	2.102	3
2.213	1.788	1.10	0.39	1.168	2.306	5
2.235	1.602	1.24	0.24	1.267	2.283	5
2.259	1.418	1.26	0.21	1.279	2.276	5
2.278	1.251	1.36	0.04	1.361	2.281	5
2.284	1.045	1.26	-0.04	1.261	2.286	4
2.271	0.874	1.19	0.10	1.198	2.286	4
2.256	0.683	1.09	-0.21	1.115	2.302	4
2.217	0.282	0.88	-0.12	0.884	2.234	3
2.227	0.107	0.50	0.03	0.501	2.230	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.6

VELCCITY FIELD   DIPOLE WEST/10   WF5/295   SMCKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 2.200 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.508	2.413	0.50	0.25	0.558	1.663	2
1.598	2.160	0.40	0.18	0.438	1.659	2
1.617	1.898	0.44	0.14	0.465	1.628	2
1.654	1.642	0.45	0.10	0.465	1.655	2
1.635	1.360	0.44	0.06	0.447	1.650	5
1.642	0.948	0.45	0.23	0.510	1.653	4
1.666	0.722	0.55	0.10	0.563	1.717	4
1.719	0.416	0.66	-0.01	0.664	1.725	1
1.715	2.313	0.51	0.22	0.560	1.817	2
1.765	2.057	0.53	0.16	0.553	1.798	2
1.783	1.810	0.50	0.11	0.514	1.786	2
1.789	1.606	0.46	0.07	0.469	1.849	5
1.975	0.967	0.76	0.00	0.760	1.983	4
1.925	0.955	0.57	0.12	0.578	1.847	4
1.850	0.647	0.67	-0.00	0.669	1.914	4
1.877	0.441	0.75	-0.03	0.749	1.881	1
1.835	0.233	0.75	-0.09	0.756	1.350	3
1.902	2.257	0.63	0.23	0.671	1.978	2
1.942	2.043	0.62	0.21	0.651	1.970	2
1.985	1.832	0.61	0.18	0.638	1.988	2
2.073	1.489	0.72	0.14	0.732	2.108	5
2.085	1.266	0.75	0.02	0.751	2.089	5
2.099	1.018	0.82	-0.03	0.823	2.103	4
2.071	0.777	0.86	-0.15	0.872	2.102	4
2.027	0.632	0.75	-0.04	0.749	2.089	4
2.043	0.457	0.92	0.01	0.923	2.094	3

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.005	0.270	0.82	-0.14	0.834	2.023	3
2.014	0.090	0.88	-0.09	0.884	2.016	3
2.074	2.195	0.71	0.23	0.747	2.130	2
2.058	2.007	0.76	0.22	0.790	2.119	2
2.100	1.824	0.77	0.18	0.795	2.209	5
2.176	1.662	0.86	0.24	0.894	2.238	5
2.197	1.455	0.87	0.12	0.879	2.220	5
2.204	1.248	0.87	0.10	0.877	2.207	5
2.225	1.011	0.90	-0.08	0.907	2.229	4
2.220	0.820	0.96	-0.14	0.966	2.243	4
2.194	0.627	0.93	-0.21	0.955	2.253	4
2.161	0.437	1.00	-0.23	1.028	2.205	3
2.145	0.292	1.04	-0.16	1.050	2.165	3
2.137	0.095	1.07	-0.04	1.072	2.139	3
2.174	2.139	0.84	0.20	0.859	2.216	2
2.198	1.979	1.13	0.30	1.173	2.214	2
2.249	1.800	1.02	0.36	1.084	2.344	5
2.276	1.610	1.15	0.23	1.171	2.324	5
2.300	1.424	1.16	0.19	1.172	2.317	5
2.322	1.253	1.22	0.06	1.226	2.325	5
2.325	1.044	1.18	-0.02	1.176	2.327	4
2.310	0.877	1.12	0.06	1.121	2.325	4
2.293	0.675	1.05	-0.21	1.072	2.339	4
2.279	0.469	1.31	-0.11	1.316	2.327	3
2.247	0.278	0.90	-0.12	0.907	2.264	3
2.247	0.106	0.66	-0.05	0.666	2.250	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND CBSERVEC TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN AFE INVARIANT UNDER SCALING.

TABLE 7.7

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 2.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.558	2.438	0.48	0.24	0.536	1.719	2
1.636	2.176	0.36	0.15	0.392	1.701	2
1.660	1.911	0.40	0.12	0.416	1.672	2
1.696	1.652	0.39	0.10	0.398	1.697	2
1.676	1.365	0.38	0.05	0.388	1.692	5
1.685	0.972	0.40	0.24	0.467	1.693	4
1.718	0.734	0.47	0.12	0.482	1.765	4
1.780	0.418	0.54	0.04	0.538	1.786	1
1.763	2.334	0.44	0.21	0.482	1.870	2
1.815	2.072	0.45	0.14	0.468	1.850	2
1.830	1.821	0.42	0.10	0.434	1.834	2
1.832	1.612	0.39	0.06	0.390	1.892	5
2.046	0.959	0.63	0.03	0.628	2.053	4
1.878	0.868	0.48	0.14	0.498	1.897	4
1.912	0.648	0.55	0.03	0.549	1.974	4
1.946	0.440	0.60	0.00	0.599	1.995	3
1.904	0.225	0.61	-0.05	0.612	1.917	3
1.961	2.280	0.53	0.22	0.574	2.042	2
2.000	2.064	0.51	0.19	0.549	2.030	2
2.041	1.849	0.49	0.15	0.508	2.045	2
2.144	1.502	0.56	0.12	0.575	2.174	5
2.152	1.259	0.57	0.03	0.573	2.156	5
2.175	1.016	0.66	-0.01	0.664	2.178	4
2.151	0.764	0.71	-0.10	0.720	2.183	4
2.095	0.631	0.60	0.01	0.595	2.156	4
2.123	0.444	0.69	-0.15	0.710	2.169	3

X-SCAL METESS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.082	0.257	0.68	-0.12	0.689	2.098	3
2.103	0.082	0.88	-0.06	0.879	2.105	3
2.142	2.220	0.62	0.24	0.664	2.201	2
2.168	2.029	0.61	0.21	0.642	2.191	2
2.171	1.839	0.62	0.13	0.635	2.281	5
2.255	1.684	0.70	0.19	0.729	2.320	5
2.276	1.465	0.69	0.09	0.693	2.299	5
2.284	1.257	0.69	0.08	0.698	2.287	5
2.308	1.006	0.73	-0.03	0.730	2.312	4
2.312	0.808	0.84	-0.10	0.848	2.335	4
2.285	0.609	0.85	-0.16	0.869	2.346	4
2.257	0.421	0.87	-0.10	0.875	2.296	3
2.237	0.274	0.80	-0.11	0.808	2.254	3
2.239	0.089	0.93	-0.07	0.932	2.241	3
2.255	2.163	0.75	0.26	0.792	2.300	2
2.299	2.008	0.85	0.25	0.890	2.317	2
2.343	1.833	0.82	0.28	0.868	2.443	5
2.380	1.633	0.90	0.22	0.928	2.431	5
2.404	1.441	0.89	0.14	0.903	2.423	5
2.429	1.262	0.91	0.10	0.911	2.433	5
2.433	1.044	0.95	0.01	0.949	2.435	4
2.414	0.878	0.92	-0.02	0.919	2.428	4
2.393	0.655	0.92	-0.18	0.938	2.442	4
2.402	0.459	1.10	-0.10	1.107	2.446	3
2.340	0.267	0.92	-0.10	0.922	2.355	3
2.332	0.094	0.96	-0.17	0.971	2.334	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.8

VELOCITY FIELD   DIPOLE WEST/10   WFS/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 2.600 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.575	2.446	0.47	0.23	0.523	1.737	2
1.643	2.182	0.36	0.15	0.384	1.714	2
1.674	1.915	0.39	0.12	0.405	1.686	2
1.709	1.655	0.37	0.09	0.382	1.710	2
1.689	1.367	0.37	0.05	0.375	1.705	5
1.699	0.990	0.39	0.24	0.458	1.706	4
1.733	0.738	0.44	0.12	0.461	1.779	4
1.799	0.419	0.50	0.05	0.502	1.804	1
1.778	2.341	0.41	0.20	0.462	1.986	2
1.829	2.076	0.42	0.13	0.445	1.865	2
1.844	1.824	0.40	0.09	0.414	1.848	2
1.845	1.614	0.37	0.05	0.373	1.905	5
2.066	0.970	0.59	0.04	0.594	2.073	4
1.894	0.873	0.46	0.14	0.480	1.912	4
1.930	0.649	0.51	0.04	0.516	1.991	4
1.965	0.440	0.55	0.01	0.554	2.014	3
1.924	0.224	0.57	-0.04	0.569	1.937	3
1.979	2.287	0.50	0.21	0.543	2.061	2
2.017	2.070	0.48	0.19	0.519	2.048	2
2.057	1.954	0.45	0.13	0.474	2.061	2
2.162	1.506	0.52	0.11	0.536	2.193	5
2.171	1.270	0.53	0.04	0.527	2.175	5
2.197	1.016	0.62	-0.00	0.620	2.200	4
2.174	0.761	0.67	-0.08	0.675	2.207	4
2.115	0.632	0.55	0.03	0.554	2.175	4
2.145	0.440	0.64	-0.11	0.650	2.190	3
2.104	0.253	0.64	-0.11	0.645	2.119	3
2.132	0.080	0.84	-0.03	0.836	2.134	3
2.163	2.228	0.59	0.24	0.637	2.223	2
2.187	2.036	0.57	0.20	0.601	2.211	2
2.191	1.844	0.58	0.12	0.593	2.302	5
2.279	1.690	0.66	0.18	0.682	2.344	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.299	1.468	0.64	0.08	0.643	2.322	5
2.307	1.260	0.64	0.07	0.647	2.310	5
2.332	1.005	0.68	-0.02	0.682	2.336	4
2.340	0.805	0.80	-0.09	0.807	2.363	4
2.314	0.602	0.82	-0.15	0.835	2.375	4
2.285	0.418	0.82	-0.07	0.821	2.324	3
2.264	0.272	0.76	-0.04	0.761	2.280	3
2.270	0.087	0.89	-0.08	0.894	2.272	3
2.280	2.172	0.71	0.27	0.765	2.326	2
2.3[illegible]6	2.016	0.77	0.24	0.811	2.346	2
2.370	1.842	0.77	0.26	0.807	2.472	5
2.409	1.640	0.83	0.21	0.860	2.461	5
2.433	1.445	0.82	0.13	0.829	2.452	5
2.4[illegible]9	1.265	0.82	0.10	0.831	2.462	5
2.465	1.044	0.88	0.01	0.883	2.466	4
2.444	0.877	0.86	-0.04	0.861	2.458	4
2.424	0.649	0.88	-0.17	0.892	2.473	4
2.439	0.455	1.04	-0.09	1.045	2.481	3
2.371	0.263	0.90	-0.09	0.910	2.386	3
2.366	0.088	0.99	-0.17	1.000	2.367	3
2.466	2.196	0.73	0.40	0.836	2.513	2
2.479	2.003	0.83	0.42	0.931	2.626	5
2.501	1.802	1.00	0.37	1.069	2.588	5
2.536	1.630	1.03	0.32	1.077	2.583	5
2.554	1.450	1.11	0.22	1.131	2.572	5
2.562	1.270	1.10	0.14	1.108	2.566	5
2.566	1.084	1.00	-0.00	0.999	2.567	4
2.565	0.873	0.96	-0.03	0.963	2.579	4
2.546	0.684	0.96	-0.12	0.973	2.586	4
2.572	0.543	0.87	-0.04	0.872	2.640	4
2.530	0.306	0.90	-0.08	0.906	2.549	3
2.499	0.132	0.60	-0.09	0.612	2.502	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.9

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.634	2.474	0.39	0.19	0.434	1.802	2
1.696	2.200	0.35	0.12	0.371	1.764	2
1.725	1.929	0.37	0.10	0.382	1.738	2
1.756	1.668	0.33	0.09	0.341	1.757	2
1.738	1.373	0.35	0.04	0.349	1.754	5
1.751	1.011	0.38	0.22	0.434	1.755	4
1.789	0.755	0.37	0.12	0.395	1.829	4
1.857	0.429	0.37	0.10	0.384	1.861	1
1.830	2.369	0.35	0.18	0.398	1.943	2
1.882	2.093	0.36	0.11	0.374	1.920	2
1.896	1.835	0.35	0.07	0.360	1.900	2
1.892	1.620	0.33	0.03	0.332	1.952	5
2.140	0.977	0.49	0.05	0.497	2.146	4
1.952	0.893	0.40	0.15	0.429	1.957	4
1.992	0.658	0.40	0.08	0.410	2.049	4
2.029	0.444	0.40	0.04	0.400	2.077	3
1.991	0.222	0.42	0.01	0.423	2.004	3
2.039	2.314	0.38	0.18	0.425	2.126	2
2.076	2.073	0.39	0.15	0.414	2.110	2
2.112	1.868	0.37	0.08	0.376	2.117	2
2.225	1.521	0.42	0.10	0.432	2.258	5
2.233	1.280	0.40	0.12	0.422	2.237	5
2.271	1.017	0.49	0.02	0.496	2.274	4
2.255	0.753	0.52	-0.04	0.523	2.288	4
2.181	0.638	0.42	0.07	0.429	2.237	4
2.220	0.434	0.46	0.01	0.465	2.262	3
2.180	0.242	0.49	-0.05	0.492	2.194	3
2.236	2.259	0.49	0.21	0.532	2.302	2
2.255	2.061	0.44	0.16	0.469	2.292	2
2.261	1.860	0.45	0.12	0.470	2.373	5
2.358	1.711	0.51	0.13	0.530	2.426	5
2.374	1.478	0.49	0.07	0.495	2.399	5
2.383	1.267	0.48	0.04	0.483	2.386	5
2.414	1.005	0.53	0.01	0.530	2.417	4
2.438	0.796	0.64	-0.04	0.642	2.462	4
2.416	0.586	0.68	-0.09	0.681	2.478	4
2.385	0.080	0.80	0.00	0.804	2.386	3

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.358	2.209	0.58	0.26	0.634	2.420	2
2.414	2.044	0.53	0.17	0.561	2.578	5
2.460	1.872	0.58	0.19	0.609	2.567	5
2.507	1.665	0.62	0.16	0.640	2.562	5
2.528	1.459	0.60	0.09	0.602	2.548	5
2.554	1.279	0.60	0.09	0.602	2.558	5
2.569	1.046	0.66	0.02	0.661	2.571	4
2.547	0.868	0.66	-0.08	0.663	2.561	4
2.531	0.629	0.71	-0.12	0.715	2.582	4
2.565	0.444	0.83	-0.06	0.831	2.603	3
2.487	0.252	0.77	-0.07	0.770	2.499	3
2.491	0.074	0.77	0.02	0.767	2.492	3
2.561	2.241	0.64	0.27	0.696	2.615	2
2.585	2.052	0.71	0.30	0.773	2.741	5
2.623	1.844	0.79	0.25	0.832	2.717	5
2.658	1.662	0.77	0.17	0.788	2.709	5
2.682	1.471	0.80	0.11	0.804	2.702	5
2.690	1.281	0.79	0.04	0.793	2.693	5
2.688	1.086	0.79	0.02	0.795	2.688	4
2.685	0.869	0.80	-0.03	0.797	2.698	4
2.664	0.667	0.78	-0.12	0.791	2.706	4
2.687	0.335	0.82	-0.07	0.819	2.754	4
2.653	0.289	0.88	-0.15	0.895	2.668	3
2.601	0.119	0.84	-0.10	0.841	2.603	3
2.726	2.170	0.47	0.16	0.498	2.915	5
2.736	1.949	0.52	0.14	0.538	2.853	5
2.771	1.764	0.59	0.20	0.627	2.845	5
2.797	1.613	0.60	0.11	0.608	2.837	5
2.813	1.440	0.65	0.12	0.663	2.829	5
2.815	1.282	0.77	0.20	0.795	2.819	5
2.832	1.041	0.65	0.03	0.656	2.834	4
2.813	0.876	0.75	0.01	0.747	2.826	4
2.810	0.680	0.82	0.06	0.819	2.847	4
2.785	0.491	0.93	-0.13	0.943	2.828	3
2.770	0.265	0.74	-0.18	0.761	2.783	3
2.761	0.107	0.83	-0.30	0.883	2.763	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.10

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 3.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.690	2.500	0.28	0.13	0.304	1.864	2
1.766	2.218	0.36	0.09	0.368	1.827	2
1.787	1.944	0.36	0.08	0.365	1.801	2
1.810	1.682	0.31	0.09	0.319	1.811	2
1.796	1.378	0.34	0.02	0.336	1.812	5
1.814	1.044	0.37	0.17	0.406	1.817	4
1.847	0.775	0.32	0.11	0.336	1.883	4
1.909	0.449	0.26	0.13	0.290	1.913	1
1.985	2.395	0.31	0.15	0.342	2.005	2
1.938	2.111	0.31	0.10	0.321	1.979	2
1.953	1.844	0.32	0.04	0.327	1.957	2
1.947	1.624	0.32	0.02	0.320	2.007	5
2.218	0.987	0.43	0.06	0.432	2.223	4
2.017	0.918	0.37	0.14	0.393	2.029	4
2.052	0.675	0.30	0.12	0.326	2.103	4
2.084	0.454	0.26	0.07	0.267	2.133	3
2.051	0.227	0.29	0.05	0.292	2.063	3
2.095	2.341	0.28	0.14	0.315	2.187	2
2.134	2.113	0.31	0.09	0.321	2.171	2
2.170	1.879	0.32	0.04	0.326	2.176	2
2.292	1.537	0.37	0.09	0.383	2.326	5
2.345	1.021	0.39	0.03	0.389	2.348	4
2.332	0.750	0.39	0.00	0.392	2.364	4
2.243	0.651	0.32	0.08	0.333	2.295	4
2.286	0.443	0.32	0.09	0.327	2.328	3
2.251	0.240	0.36	0.02	0.356	2.264	3
2.310	2.291	0.38	0.16	0.414	2.381	2
2.322	2.084	0.35	0.10	0.365	2.351	2
2.330	1.881	0.37	0.13	0.391	2.446	5
2.434	1.730	0.39	0.10	0.408	2.505	5
2.443	1.490	0.39	0.08	0.393	2.473	5
2.453	1.271	0.36	0.02	0.361	2.457	5
2.493	1.008	0.41	0.02	0.412	2.496	4
2.531	0.792	0.46	-0.01	0.462	2.555	4
2.515	0.578	0.49	-0.02	0.493	2.577	4
2.452	2.247	0.41	0.18	0.452	2.510	2
2.483	2.066	0.36	0.09	0.370	2.656	5
2.545	1.899	0.43	0.13	0.446	2.656	5
2.597	1.638	0.45	0.11	0.464	2.655	5
2.614	1.471	0.43	0.06	0.437	2.635	5
2.642	1.290	0.46	0.04	0.460	2.546	5
2.664	1.049	0.47	0.02	0.471	2.665	4
2.643	0.856	0.48	-0.06	0.484	2.658	4
2.635	0.616	0.52	-0.04	0.525	2.687	4
2.689	0.439	0.63	-0.00	0.634	2.724	3
2.588	0.243	0.39	-0.04	0.393	2.600	3
2.657	2.277	0.49	0.16	0.511	2.716	2
2.592	2.093	0.55	0.19	0.578	2.856	5
2.739	1.678	0.57	0.16	0.595	2.837	5
2.768	1.683	0.55	0.09	0.554	2.821	5
2.795	1.484	0.55	0.05	0.552	2.816	5
2.802	1.284	0.54	0.01	0.545	2.805	5
2.803	1.089	0.57	0.01	0.571	2.804	4
2.803	0.864	0.59	-0.02	0.590	2.816	4
2.780	0.651	0.59	-0.06	0.592	2.823	4
2.816	0.525	0.70	-0.05	0.699	2.883	4
2.793	0.267	0.76	-0.09	0.763	2.806	3
2.743	0.102	0.80	-0.10	0.807	2.745	3
2.810	2.200	0.50	0.19	0.535	3.004	5
2.838	1.984	0.63	0.24	0.672	2.961	5
2.880	1.813	0.64	0.15	0.660	2.958	5
2.903	1.633	0.62	0.12	0.633	2.945	5
2.916	1.459	0.55	0.10	0.563	2.933	5
2.932	1.287	0.61	-0.08	0.619	2.936	5
2.946	1.046	0.65	0.02	0.649	2.947	4
2.934	0.875	0.66	-0.02	0.658	2.946	4
2.941	0.682	0.71	-0.02	0.715	2.976	4
2.924	0.476	0.72	-0.05	0.719	2.963	3
2.916	0.253	0.82	0.02	0.822	2.926	3
2.896	0.086	0.75	-0.03	0.748	2.897	3
3.034	1.426	0.71	0.01	0.715	3.047	5
3.057	1.266	0.81	0.06	0.814	3.060	5
3.069	1.085	0.73	-0.03	0.732	3.070	4
3.079	0.894	0.72	0.01	0.721	3.089	4
3.042	0.673	0.87	-0.02	0.872	3.078	4
3.024	0.490	0.78	-0.12	0.791	3.063	3
3.037	0.317	0.76	-0.03	0.761	3.053	3
3.005	0.025	0.80	-0.02	0.800	3.006	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.11

VELOCITY FIELD DIPOLE WEST/10 WF5/295 SMOKE PUFF GRID 1209 /A770322

PARTICLE VELOCITIES AT SCALED TIME= 4.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.738	2.521	0.34	0.13	0.357	1.916	2
1.816	2.232	0.33	0.07	0.343	1.888	2
1.845	1.956	0.32	0.07	0.331	1.861	2
1.861	1.697	0.29	0.09	0.301	1.861	2
1.851	1.382	0.31	0.03	0.310	1.867	5
1.874	1.069	0.33	0.12	0.352	1.875	4
1.897	0.793	0.27	0.10	0.284	1.928	4
1.945	0.473	0.18	0.14	0.231	1.949	1
1.936	2.418	0.28	0.10	0.299	2.060	2
1.988	2.127	0.28	0.08	0.290	2.030	2
2.007	1.850	0.31	0.03	0.308	2.011	2
2.001	1.626	0.32	0.01	0.315	2.060	5
2.087	0.997	0.39	0.06	0.394	2.292	4
2.077	0.941	0.33	0.12	0.354	2.036	4
2.097	0.698	0.24	0.14	0.272	2.143	4
2.120	0.466	0.17	0.08	0.188	2.171	3
2.092	0.236	0.20	0.06	0.209	2.105	3
2.178	2.361	0.23	0.10	0.255	2.234	2
2.182	2.126	0.26	0.06	0.266	2.221	2
2.224	1.983	0.32	0.02	0.323	2.346	5
2.354	1.552	0.37	0.08	0.376	2.390	5
2.406	1.026	0.34	0.04	0.342	2.409	4
2.391	0.753	0.31	0.02	0.313	2.422	4
2.293	0.666	0.26	0.08	0.274	2.341	4
2.331	0.460	0.22	0.11	0.244	2.375	3
2.304	0.247	0.27	0.06	0.275	2.317	3
2.367	2.314	0.30	0.11	0.320	2.442	2
2.377	2.098	0.30	0.07	0.310	2.408	2
2.388	1.906	0.32	0.15	0.359	2.509	5
2.495	1.747	0.33	0.10	0.342	2.568	5
2.509	1.504	0.34	0.09	0.349	2.535	5
2.510	1.274	0.31	0.02	0.314	2.513	5
2.557	1.012	0.34	0.03	0.345	2.560	4
2.598	0.794	0.34	0.02	0.339	2.621	4
2.556	0.580	0.35	0.03	0.351	2.645	4
2.511	2.271	0.28	0.09	0.294	2.572	2
2.541	2.078	0.27	0.05	0.278	2.709	5
2.609	1.919	0.34	0.10	0.351	2.723	5
2.655	1.703	0.36	0.07	0.365	2.724	5
2.680	1.491	0.35	0.06	0.359	2.702	5
2.714	1.294	0.40	0.00	0.399	2.719	5
2.734	1.052	0.36	0.02	0.361	2.735	4
2.714	0.851	0.37	-0.00	0.371	2.729	4
2.712	0.614	0.39	0.02	0.390	2.762	4
2.785	0.443	0.50	0.05	0.506	2.820	3
2.727	2.298	0.34	0.10	0.356	2.789	2
2.771	2.120	0.40	0.13	0.418	2.940	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.822	1.901	0.41	0.11	0.428	2.923	5
2.848	1.697	0.41	0.08	0.414	2.903	5
2.875	1.493	0.41	0.06	0.416	2.897	5
2.881	1.287	0.40	0.03	0.401	2.885	5
2.886	1.090	0.41	-0.00	0.406	2.886	4
2.888	0.862	0.42	-0.00	0.422	2.901	4
2.867	0.646	0.44	-0.00	0.441	2.909	4
2.924	0.521	0.56	0.01	0.564	2.988	4
2.908	0.259	0.59	0.00	0.592	2.920	3
2.868	0.087	0.67	-0.05	0.671	2.869	3
2.832	2.233	0.45	0.19	0.489	3.092	5
2.938	2.021	0.53	0.18	0.562	3.068	5
2.921	1.835	0.53	0.11	0.540	3.061	5
3.001	1.652	0.52	0.11	0.527	3.045	5
3.002	1.475	0.47	0.09	0.474	3.021	5
3.025	1.270	0.48	-0.10	0.493	3.028	5
3.046	1.047	0.53	0.00	0.525	3.048	4
3.034	0.872	0.52	-0.02	0.518	3.046	4
3.051	0.679	0.58	-0.01	0.577	3.086	4
3.034	0.471	0.58	-0.01	0.578	3.070	3
3.031	0.260	0.55	0.03	0.554	3.042	3
3.014	0.082	0.63	-0.04	0.634	3.015	3
3.058	2.206	0.54	0.20	0.576	3.239	5
3.097	2.026	0.58	0.16	0.598	3.221	5
3.146	1.850	0.65	0.18	0.676	3.225	5
3.144	1.633	0.55	0.07	0.553	3.183	5
3.135	1.429	0.51	0.04	0.512	3.149	5
3.171	1.274	0.56	0.05	0.567	3.174	5
3.183	1.086	0.60	0.03	0.603	3.183	4
3.193	0.896	0.60	0.02	0.605	3.202	4
3.170	0.669	0.65	-0.03	0.647	3.205	4
3.145	0.477	0.64	-0.04	0.642	3.181	3
3.162	0.304	0.67	-0.10	0.681	3.177	3
3.141	0.079	0.78	-0.04	0.776	3.142	3
3.173	2.162	0.52	0.04	0.522	3.333	5
3.202	1.975	0.70	0.25	0.746	3.310	5
3.246	1.815	0.84	0.19	0.860	3.315	5
3.254	1.621	0.68	0.05	0.683	3.289	5
3.280	1.426	0.56	0.01	0.563	3.293	5
3.274	1.234	0.66	0.02	0.663	3.275	5
3.278	1.072	0.72	0.00	0.720	3.279	4
3.283	0.888	0.71	0.04	0.710	3.293	4
3.267	0.650	0.72	-0.05	0.717	3.303	4
3.261	0.488	0.69	-0.05	0.690	3.297	3
3.249	0.296	0.74	-0.16	0.759	3.262	3
3.239	0.096	0.79	-0.15	0.801	3.241	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.12

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMCKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 4.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.869	2.242	0.27	0.06	0.277	1.941	2
1.895	1.967	0.26	0.06	0.265	1.912	2
1.903	1.713	0.25	0.10	0.272	1.908	2
1.899	1.389	0.25	0.06	0.255	1.916	5
1.923	1.087	0.24	0.08	0.255	1.924	4
1.939	0.809	0.21	0.08	0.226	1.966	4
1.973	0.496	0.14	0.12	0.184	1.974	1
1.981	2.430	0.25	0.05	0.260	2.107	2
2.033	2.140	0.26	0.07	0.266	2.077	2
2.057	1.855	0.28	0.03	0.282	2.062	2
2.053	1.629	0.29	0.02	0.293	2.111	5
2.350	1.007	0.35	0.06	0.356	2.354	4
2.129	0.960	0.28	0.10	0.236	2.136	4
2.133	0.720	0.19	0.13	0.224	2.173	4
2.145	0.479	0.13	0.07	0.146	2.198	3
2.121	0.246	0.15	0.05	0.157	2.135	3
2.177	2.376	0.22	0.08	0.235	2.276	2
2.223	2.135	0.23	0.05	0.237	2.263	2
2.280	1.888	0.33	0.04	0.333	2.400	5
2.417	1.565	0.37	0.07	0.372	2.454	5
2.462	1.033	0.31	0.05	0.317	2.464	4
2.440	0.757	0.27	0.03	0.270	2.470	4
2.333	0.679	0.22	0.07	0.228	2.378	4
2.362	0.477	0.16	0.09	0.181	2.410	3
2.345	0.259	0.21	0.08	0.228	2.359	3
2.413	2.329	0.24	0.08	0.252	2.450	2
2.426	2.108	0.27	0.06	0.273	2.458	2
2.441	1.532	0.30	0.16	0.337	2.567	5
2.548	1.765	0.29	0.11	0.314	2.623	5
2.564	1.521	0.31	0.11	0.329	2.592	5
2.562	1.279	0.31	0.04	0.316	2.566	5
2.612	1.017	0.30	0.04	0.306	2.614	4
2.650	0.800	0.28	0.04	0.290	2.671	4
2.637	0.588	0.26	0.06	0.271	2.694	4
2.550	2.280	0.19	0.02	0.192	2.612	2
2.584	2.085	0.24	0.04	0.244	2.753	5
2.661	1.935	0.28	0.09	0.297	2.778	5
2.721	1.715	0.31	0.07	0.317	2.782	5
2.737	1.491	0.32	0.06	0.329	2.760	5
2.778	1.292	0.36	-0.01	0.357	2.783	5
2.790	1.055	0.31	0.03	0.312	2.791	4
2.772	0.856	0.31	0.06	0.319	2.786	4
2.771	0.621	0.31	0.06	0.313	2.819	4
2.863	0.455	0.42	0.09	0.428	2.898	3
2.776	2.314	0.24	0.08	0.258	3.014	5
2.829	2.141	0.29	0.11	0.315	3.002	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.883	1.919	0.31	0.10	0.330	2.987	5
2.910	1.712	0.33	0.09	0.339	2.966	5
2.938	1.505	0.34	0.08	0.348	2.961	5
2.941	1.295	0.32	0.06	0.326	2.946	5
2.945	1.089	0.31	0.01	0.309	2.946	4
2.950	0.865	0.32	0.03	0.317	2.962	4
2.933	0.650	0.34	0.05	0.345	2.974	4
3.009	0.526	0.45	0.06	0.449	3.071	4
2.996	0.267	0.44	0.08	0.447	3.007	3
2.972	0.083	0.56	0.01	0.558	2.973	3
2.962	2.263	0.37	0.16	0.407	3.168	5
3.016	2.044	0.38	0.10	0.392	3.149	5
3.058	1.852	0.38	0.10	0.391	3.140	5
3.077	1.670	0.38	0.10	0.393	3.123	5
3.075	1.489	0.39	0.07	0.397	3.095	5
3.098	1.260	0.37	-0.02	0.375	3.100	5
3.123	1.048	0.38	0.01	0.383	3.125	4
3.111	0.871	0.39	0.01	0.387	3.122	4
3.138	0.681	0.45	0.04	0.450	3.171	4
3.123	0.473	0.48	0.03	0.481	3.159	3
3.117	0.255	0.49	-0.08	0.496	3.127	3
3.111	0.072	0.51	-0.06	0.516	3.112	3
3.143	2.239	0.44	0.18	0.477	3.330	5
3.178	2.049	0.40	0.12	0.418	3.306	5
3.241	1.873	0.48	0.10	0.488	3.323	5
3.222	1.641	0.38	0.04	0.387	3.261	5
3.214	1.440	0.42	0.08	0.433	3.228	5
3.257	1.284	0.46	0.07	0.466	3.261	5
3.274	1.092	0.47	0.03	0.467	3.274	4
3.284	0.898	0.46	0.01	0.463	3.293	4
3.267	0.667	0.50	0.02	0.502	3.301	4
3.244	0.474	0.53	0.01	0.528	3.278	3
3.260	0.289	0.48	-0.07	0.484	3.273	3
3.260	0.074	0.59	-0.00	0.588	3.260	3
3.256	2.193	0.45	0.17	0.481	3.419	5
3.297	2.007	0.45	0.14	0.468	3.410	5
3.353	1.836	0.48	0.09	0.486	3.425	5
3.344	1.630	0.44	0.06	0.443	3.380	5
3.368	1.431	0.47	0.05	0.473	3.381	5
3.374	1.245	0.52	0.09	0.525	3.375	5
3.390	1.074	0.57	0.02	0.572	3.391	4
3.393	0.893	0.56	0.02	0.564	3.402	4
3.371	0.645	0.54	-0.01	0.535	3.407	4
3.369	0.480	0.58	-0.03	0.581	3.403	3
3.361	0.281	0.58	-0.02	0.582	3.372	3
3.361	0.084	0.49	0.04	0.495	3.362	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.13

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.906	2.251	0.17	0.05	0.179	1.980	2
1.931	1.977	0.16	0.06	0.173	1.949	2
1.946	1.731	0.20	0.11	0.226	2.034	5
1.934	1.402	0.16	0.10	0.186	1.752	5
1.954	1.099	0.11	0.06	0.126	1.954	4
1.958	0.821	0.14	0.08	0.157	1.993	4
1.994	0.514	0.10	0.09	0.138	2.089	4
2.021	2.437	0.21	0.03	0.212	2.147	2
2.074	2.152	0.23	0.07	0.238	2.120	2
2.101	1.861	0.23	0.04	0.237	2.106	2
2.099	1.635	0.24	0.04	0.245	2.157	5
2.405	1.018	0.29	0.07	0.302	2.408	4
2.170	0.975	0.20	0.07	0.214	2.176	4
2.160	0.739	0.14	0.10	0.170	2.197	4
2.165	0.439	0.11	0.05	0.120	2.220	3
2.144	0.254	0.12	0.03	0.121	2.158	3
2.214	2.389	0.21	0.08	0.223	2.315	2
2.261	2.145	0.21	0.06	0.219	2.302	2
2.336	1.899	0.32	0.09	0.333	2.437	5
2.478	1.575	0.35	0.05	0.349	2.516	5
2.513	1.042	0.29	0.05	0.293	2.515	4
2.484	0.761	0.24	0.02	0.242	2.512	4
2.365	0.690	0.17	0.06	0.180	2.408	4
2.385	0.490	0.11	0.06	0.124	2.434	3
2.378	0.271	0.18	0.06	0.191	2.393	3
2.450	2.341	0.19	0.07	0.204	2.529	2
2.469	2.120	0.24	0.08	0.254	2.503	2
2.491	1.957	0.28	0.13	0.307	2.622	5
2.596	1.785	0.28	0.13	0.305	2.675	5
2.615	1.539	0.29	0.11	0.309	2.646	5
2.617	1.289	0.33	0.08	0.340	2.622	5
2.661	1.026	0.27	0.06	0.279	2.663	4
2.695	0.808	0.27	0.05	0.271	2.716	4
2.679	0.597	0.24	0.05	0.241	2.733	4
2.578	2.281	0.15	-0.01	0.152	2.640	2
2.624	2.094	0.23	0.06	0.236	2.793	5
2.706	1.949	0.25	0.08	0.264	2.825	5
2.772	1.728	0.28	0.09	0.295	2.834	5
2.791	1.503	0.31	0.07	0.317	2.814	5
2.835	1.292	0.30	0.01	0.299	2.839	5
2.841	1.064	0.29	0.06	0.299	2.842	4
2.823	0.859	0.29	0.09	0.304	2.836	4
2.819	0.632	0.27	0.06	0.276	2.865	4
2.929	0.472	0.36	0.11	0.378	2.956	3
2.813	2.328	0.21	0.09	0.223	3.055	5
2.874	2.160	0.24	0.12	0.272	3.051	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.932	1.937	0.27	0.11	0.291	3.039	5
2.961	1.723	0.28	0.10	0.301	3.020	5
2.992	1.519	0.30	0.08	0.312	3.016	5
2.992	1.306	0.28	0.07	0.285	2.996	5
2.994	1.093	0.28	0.04	0.279	2.993	4
2.999	0.873	0.27	0.06	0.280	3.011	4
2.996	0.661	0.28	0.07	0.292	3.024	4
3.077	0.540	0.36	0.09	0.368	3.135	4
3.061	0.282	0.33	0.09	0.346	3.074	3
3.057	0.088	0.43	0.05	0.433	3.058	3
3.019	2.288	0.30	0.13	0.324	3.230	5
3.069	2.058	0.26	0.07	0.272	3.204	5
3.112	1.868	0.28	0.10	0.293	3.197	5
3.132	1.686	0.28	0.09	0.294	3.180	5
3.135	1.501	0.33	0.05	0.332	3.156	5
3.154	1.264	0.29	0.07	0.300	3.157	5
3.179	1.051	0.28	0.03	0.283	3.180	4
3.169	0.876	0.30	0.05	0.302	3.179	4
3.206	0.692	0.35	0.08	0.363	3.237	4
3.198	0.480	0.40	0.06	0.402	3.234	3
3.197	0.244	0.39	0.03	0.393	3.206	3
3.188	0.070	0.38	0.08	0.390	3.188	3
3.207	2.265	0.32	0.13	0.346	3.400	5
3.238	2.067	0.31	0.10	0.324	3.368	5
3.310	1.890	0.35	0.10	0.364	3.395	5
3.280	1.651	0.31	0.09	0.323	3.320	5
3.280	1.456	0.36	0.10	0.370	3.296	5
3.330	1.298	0.39	0.09	0.397	3.333	5
3.343	1.097	0.35	0.03	0.352	3.343	4
3.352	0.902	0.35	0.03	0.353	3.361	4
3.344	0.674	0.41	0.06	0.413	3.376	4
3.326	0.479	0.44	0.04	0.438	3.360	3
3.329	0.283	0.35	-0.01	0.353	3.341	3
3.332	0.081	0.24	0.09	0.255	3.333	3
3.324	2.212	0.36	0.15	0.387	3.493	5
3.362	2.027	0.33	0.10	0.346	3.477	5
3.422	1.851	0.36	0.10	0.375	3.496	5
3.413	1.644	0.38	0.10	0.396	3.450	5
3.440	1.443	0.38	0.08	0.388	3.454	5
3.452	1.259	0.41	0.08	0.418	3.454	5
3.471	1.079	0.38	0.03	0.384	3.471	4
3.475	0.897	0.41	0.03	0.406	3.483	4
3.454	0.648	0.45	0.05	0.454	3.489	4
3.459	0.479	0.49	0.03	0.488	3.492	3
3.449	0.285	0.47	0.06	0.473	3.461	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.14

VELOCITY FIELD   DIPOLE WEST/10   WFS/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 5.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.926	2.259	0.07	0.05	0.084	2.002	2	2.848	2.343	0.20	0.09	0.224	3.092	5
1.950	1.987	0.06	0.06	0.080	1.969	2	2.915	2.182	0.23	0.13	0.269	3.096	5
1.974	1.750	0.13	0.11	0.168	2.066	5	2.976	1.957	0.26	0.12	0.265	3.087	5
1.953	1.422	0.06	0.14	0.149	1.973	5	3.008	1.744	0.26	0.09	0.279	3.068	5
1.961	1.108	-0.02	0.05	0.053	1.961	4	3.041	1.533	0.28	0.08	0.285	3.067	5
1.984	0.835	0.05	0.08	0.091	2.007	4	3.036	1.318	0.25	0.06	0.259	3.042	5
2.009	0.527	0.07	0.06	0.089	2.100	4	3.041	1.105	0.28	0.10	0.296	3.041	4
2.051	2.445	0.13	0.08	0.155	2.178	2	3.045	0.886	0.27	0.09	0.286	3.055	4
2.110	2.162	0.19	0.05	0.196	2.157	2	3.031	0.672	0.25	0.06	0.259	3.067	4
2.135	1.870	0.16	0.07	0.178	2.141	2	3.132	0.557	0.30	0.10	0.314	3.186	4
2.134	1.643	0.17	0.06	0.176	2.193	5	3.112	0.295	0.28	0.05	0.280	3.126	3
2.449	1.029	0.22	0.07	0.229	2.452	4	3.106	0.091	0.08	-0.04	0.092	3.108	3
2.196	0.986	0.10	0.06	0.120	2.201	4	3.064	2.308	0.24	0.10	0.262	3.280	5
2.180	0.753	0.09	0.05	0.108	2.214	4	3.110	2.071	0.22	0.09	0.242	3.247	5
2.183	0.495	0.10	0.02	0.098	2.238	3	3.156	1.885	0.24	0.10	0.265	3.243	5
2.161	0.256	0.09	0.00	0.089	2.176	3	3.175	1.702	0.24	0.10	0.255	3.225	5
2.245	2.403	0.14	0.09	0.170	2.349	2	3.187	1.509	0.28	0.04	0.279	3.208	5
2.294	2.158	0.18	0.09	0.201	2.337	2	3.199	1.281	0.24	0.12	0.269	3.202	5
2.387	1.918	0.27	0.13	0.300	2.511	5	3.223	1.060	0.24	0.07	0.252	3.224	4
2.532	1.583	0.29	0.04	0.292	2.571	5	3.215	0.888	0.26	0.09	0.273	3.225	4
2.553	1.053	0.24	0.07	0.249	2.560	4	3.261	0.707	0.30	0.10	0.312	3.289	4
2.522	0.764	0.21	0.01	0.209	2.550	4	3.259	0.491	0.32	0.08	0.327	3.296	3
2.390	0.699	0.11	0.05	0.121	2.430	4	3.254	2.284	0.24	0.10	0.259	3.450	5
2.400	0.496	0.07	0.02	0.075	2.484	4	3.285	2.084	0.26	0.10	0.277	3.419	5
2.406	0.279	0.15	0.03	0.151	2.422	3	3.363	1.908	0.28	0.11	0.297	3.450	5
2.479	2.353	0.16	0.07	0.171	2.561	2	3.328	1.670	0.25	0.12	0.281	3.370	5
2.507	2.136	0.20	0.11	0.229	2.543	2	3.334	1.472	0.27	0.08	0.278	3.350	5
2.535	1.976	0.25	0.09	0.263	2.670	5	3.388	1.312	0.30	0.07	0.309	3.393	5
2.642	1.807	0.27	0.13	0.295	2.726	5	3.395	1.104	0.27	0.05	0.277	3.395	4
2.662	1.557	0.26	0.10	0.278	2.695	5	3.407	0.910	0.29	0.07	0.301	3.414	4
2.674	1.206	0.33	0.11	0.345	2.679	5	3.408	0.686	0.34	0.08	0.353	3.437	4
2.704	1.038	0.24	0.08	0.250	2.706	4	3.393	0.488	0.36	0.06	0.360	3.428	3
2.741	0.817	0.27	0.05	0.277	2.760	4	3.386	0.284	0.32	0.02	0.325	3.398	3
2.719	0.604	0.23	0.03	0.236	2.771	4	3.378	2.232	0.28	0.10	0.299	3.551	5
2.604	2.280	0.16	0.01	0.156	2.665	2	3.414	2.043	0.28	0.10	0.296	3.532	5
2.662	2.107	0.21	0.09	0.230	2.833	5	3.480	1.670	0.33	0.12	0.349	3.556	5
2.747	1.961	0.23	0.06	0.235	2.868	5	3.475	1.664	0.34	0.12	0.365	3.515	5
2.819	1.745	0.26	0.11	0.284	2.882	5	3.499	1.457	0.31	0.08	0.321	3.513	5
2.842	1.516	0.29	0.08	0.299	2.867	5	3.515	1.269	0.33	0.05	0.329	3.517	5
2.879	1.297	0.22	0.05	0.231	2.884	5	3.526	1.085	0.28	0.04	0.287	3.526	4
2.890	1.079	0.28	0.09	0.296	2.891	4	3.536	0.903	0.33	0.05	0.331	3.543	4
2.871	0.886	0.27	0.10	0.289	2.882	4	3.526	0.659	0.39	0.07	0.399	3.558	4
2.864	0.641	0.25	0.04	0.255	2.906	4	3.535	0.488	0.40	0.06	0.405	3.568	3
2.987	0.490	0.32	0.10	0.333	3.027	3	3.523	0.297	0.41	0.08	0.415	3.536	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.15

VELOCITY FIELD   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME= 6.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.932	2.268	0.01	0.07	0.067	2.010	2
1.955	1.996	0.01	0.05	0.052	1.976	2
1.990	1.767	0.06	0.08	0.105	1.990	2
1.957	1.446	0.01	0.14	0.142	1.981	5
1.950	1.116	-0.09	0.04	0.099	1.950	4
1.985	0.847	-0.03	0.07	0.074	2.006	4
2.016	0.535	0.01	0.04	0.047	2.105	4
2.137	2.170	0.13	0.04	0.134	2.185	2
2.156	1.884	0.08	0.09	0.125	2.163	2
2.155	1.653	0.09	0.06	0.104	2.216	5
2.479	1.041	0.13	0.07	0.143	2.480	4
2.206	0.996	0.02	0.06	0.060	2.211	4
2.190	0.761	0.03	0.04	0.048	2.222	4
2.197	0.496	0.06	-0.00	0.057	2.289	4
2.173	0.256	0.04	-0.00	0.041	2.188	3
2.255	2.421	-0.06	0.12	0.130	2.363	2
2.322	2.173	0.13	0.09	0.160	2.367	2
2.425	1.939	0.17	0.11	0.202	2.554	5
2.574	1.591	0.20	0.06	0.207	2.614	5
2.592	1.065	0.15	0.07	0.170	2.593	4
2.553	0.764	0.14	-0.00	0.142	2.580	4
2.403	0.707	0.04	0.03	0.049	2.441	4
2.409	0.498	0.03	0.01	0.032	2.492	4
2.427	0.284	0.10	0.02	0.098	2.444	3
2.503	2.354	0.12	0.06	0.136	2.536	2
2.538	2.154	0.16	0.10	0.184	2.576	2
2.575	1.986	0.21	0.04	0.216	2.711	5
2.686	1.627	0.24	0.10	0.264	2.773	5
2.703	1.571	0.22	0.07	0.233	2.738	5
2.725	1.325	0.26	0.11	0.280	2.731	5
2.740	1.052	0.19	0.08	0.205	2.742	4
2.785	0.825	0.24	0.04	0.243	2.803	4
2.758	0.606	0.21	-0.00	0.211	2.809	4
2.633	2.284	0.18	0.03	0.187	2.694	2
2.695	2.123	0.18	0.09	0.200	2.869	5
2.783	1.970	0.19	0.03	0.198	2.905	5
2.861	1.764	0.24	0.11	0.267	2.928	5
2.883	1.530	0.25	0.08	0.262	2.914	5
2.912	1.310	0.16	0.09	0.184	2.917	5
2.935	1.095	0.24	0.10	0.262	2.935	4
2.914	0.902	0.23	0.08	0.241	2.923	4
2.905	0.645	0.22	0.00	0.224	2.946	4
3.037	0.504	0.27	0.07	0.276	3.102	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.882	2.359	0.19	0.09	0.207	3.130	5
2.954	2.204	0.23	0.13	0.264	3.141	5
3.019	1.978	0.25	0.12	0.275	3.134	5
3.052	1.758	0.25	0.07	0.262	3.114	5
3.086	1.545	0.25	0.06	0.260	3.113	5
3.078	1.328	0.24	0.06	0.247	3.084	5
3.089	1.125	0.28	0.13	0.310	3.089	4
3.092	0.901	0.27	0.08	0.287	3.101	4
3.072	0.679	0.22	0.02	0.226	3.106	4
3.180	0.572	0.26	0.07	0.271	3.230	4
3.156	0.298	0.25	-0.01	0.250	3.170	3
3.102	2.325	0.21	0.10	0.235	3.321	5
3.149	2.091	0.24	0.14	0.279	3.290	5
3.198	1.903	0.26	0.10	0.276	3.288	5
3.216	1.718	0.24	0.09	0.258	3.268	5
3.230	1.515	0.24	0.03	0.238	3.252	5
3.239	1.301	0.24	0.11	0.264	3.243	5
3.265	1.074	0.25	0.10	0.269	3.265	4
3.258	0.904	0.25	0.10	0.268	3.266	4
3.308	0.723	0.26	0.08	0.274	3.334	4
3.306	0.506	0.24	0.09	0.252	3.366	4
3.292	2.301	0.21	0.10	0.238	3.491	5
3.326	2.103	0.23	0.11	0.253	3.463	5
3.407	1.926	0.24	0.10	0.263	3.497	5
3.366	1.690	0.19	0.10	0.215	3.410	5
3.371	1.483	0.18	0.05	0.189	3.389	5
3.432	1.322	0.21	0.05	0.219	3.437	5
3.438	1.115	0.24	0.09	0.251	3.438	4
3.454	0.925	0.27	0.10	0.286	3.461	4
3.461	0.700	0.29	0.08	0.298	3.489	4
3.447	0.499	0.28	0.06	0.286	3.505	4
3.439	0.288	0.27	0.02	0.273	3.451	3
3.422	2.248	0.23	0.09	0.253	3.597	5
3.459	2.060	0.24	0.11	0.266	3.579	5
3.533	1.890	0.28	0.11	0.304	3.612	5
3.528	1.683	0.26	0.10	0.281	3.569	5
3.547	1.469	0.26	0.06	0.264	3.562	5
3.564	1.277	0.25	0.04	0.258	3.567	5
3.573	1.092	0.27	0.04	0.274	3.573	4
3.590	0.913	0.32	0.07	0.325	3.597	4
3.587	0.671	0.32	0.07	0.328	3.617	4
3.596	0.498	0.32	0.05	0.321	3.652	4
3.590	0.310	0.39	0.05	0.395	3.604	3

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.16

VELOCITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

PARTICLE VELOCITIES AT SCALED TIME=   6.500 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.938	2.283	0.08	0.11	0.136	2.020	2
1.950	2.003	0.06	0.04	0.074	1.981	2
1.997	1.776	0.03	0.01	0.036	1.978	2
1.961	1.456	0.06	0.08	0.099	1.938	5
1.940	1.122	0.00	0.03	0.032	1.940	4
1.974	0.856	-0.09	0.04	0.096	1.994	4
2.011	0.545	-0.08	0.08	0.115	2.097	4
2.153	2.175	0.05	0.02	0.052	2.202	2
2.163	1.902	0.00	0.12	0.118	2.171	2
2.165	1.660	0.04	0.02	0.043	2.227	5
2.493	1.050	0.04	0.04	0.057	2.494	4
2.205	1.007	-0.02	0.07	0.078	2.209	4
2.189	0.758	-0.05	0.05	0.071	2.220	4
2.199	0.495	-0.04	-0.01	0.044	2.254	3
2.172	0.258	-0.05	0.03	0.061	2.188	3
2.338	2.184	0.05	0.03	0.062	2.385	2
2.440	1.950	-0.01	-0.01	0.011	2.571	5
2.598	1.606	0.08	0.14	0.160	2.640	5
2.608	1.076	0.02	0.05	0.058	2.608	4
2.557	0.763	0.01	-0.01	0.016	2.594	4
2.402	0.710	-0.05	0.01	0.052	2.439	4
2.411	0.500	-0.01	0.02	0.018	2.494	4
2.436	0.291	0.00	0.08	0.075	2.453	3
2.521	2.371	0.08	0.01	0.083	2.605	2
2.560	2.164	0.11	-0.00	0.109	2.600	2
2.603	1.991	0.17	0.03	0.177	2.744	5
2.724	1.939	0.20	0.03	0.200	2.812	5
2.738	1.579	0.19	0.02	0.189	2.773	5
2.755	1.338	0.07	0.04	0.083	2.762	5
2.768	1.061	0.13	0.01	0.135	2.769	4
2.817	0.829	0.10	-0.00	0.096	2.834	4
2.785	0.604	0.09	-0.02	0.092	2.836	4
2.666	2.290	0.21	0.03	0.209	2.728	2
2.720	2.135	0.12	0.03	0.120	2.897	5
2.813	1.971	0.15	-0.02	0.153	2.934	5
2.900	1.779	0.23	0.05	0.231	2.970	5
2.925	1.542	0.19	0.06	0.198	2.953	5
2.938	1.324	0.17	0.07	0.180	2.944	5
2.969	1.108	0.14	0.05	0.149	2.969	4
2.945	0.911	0.13	0.02	0.136	2.954	4
2.937	0.642	0.14	-0.03	0.142	2.978	4
3.076	0.512	0.19	0.02	0.194	3.140	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.907	2.370	0.08	0.04	0.092	3.157	5
2.991	2.222	0.18	0.07	0.198	3.181	5
3.058	1.996	0.20	0.07	0.214	3.176	5
3.094	1.769	0.24	0.06	0.247	3.157	5
3.127	1.555	0.23	0.07	0.243	3.155	5
3.119	1.340	0.25	0.09	0.267	3.126	5
3.134	1.143	0.23	0.08	0.240	3.134	5
3.135	0.911	0.22	0.03	0.219	3.143	4
3.106	0.679	0.17	-0.03	0.173	3.140	4
3.221	0.578	0.22	0.01	0.222	3.270	4
3.196	0.294	0.21	-0.01	0.210	3.210	3
3.138	2.344	0.21	0.13	0.244	3.361	5
3.192	2.113	0.25	0.11	0.268	3.337	5
3.242	1.917	0.24	0.06	0.244	3.334	5
3.257	1.732	0.24	0.06	0.251	3.311	5
3.268	1.518	0.21	0.01	0.210	3.290	5
3.283	1.320	0.29	0.11	0.313	3.288	5
3.308	1.090	0.26	0.09	0.271	3.309	4
3.299	0.918	0.22	0.05	0.230	3.306	4
3.349	0.733	0.22	0.05	0.220	3.373	4
3.340	0.519	0.16	0.05	0.174	3.397	4
3.329	2.318	0.23	0.09	0.244	3.532	5
3.364	2.121	0.22	0.10	0.240	3.504	5
3.447	1.939	0.22	0.06	0.230	3.539	5
3.395	1.699	0.17	0.01	0.169	3.441	5
3.401	1.490	0.20	0.05	0.204	3.419	5
3.465	1.332	0.20	0.08	0.216	3.470	5
3.477	1.132	0.24	0.11	0.258	3.477	4
3.497	0.939	0.23	0.06	0.233	3.503	4
3.505	0.712	0.23	0.07	0.238	3.531	4
3.488	0.506	0.20	0.03	0.206	3.545	4
3.463	0.289	-0.07	-0.00	0.071	3.475	3
3.459	2.265	0.21	0.10	0.231	3.638	5
3.496	2.077	0.20	0.09	0.217	3.620	5
3.575	1.906	0.20	0.09	0.221	3.656	5
3.565	1.695	0.18	0.04	0.188	3.608	5
3.586	1.477	0.20	0.04	0.204	3.602	5
3.602	1.286	0.20	0.07	0.218	3.606	5
3.615	1.099	0.20	0.03	0.200	3.615	4
3.641	0.926	0.25	0.08	0.266	3.647	4
3.634	0.681	0.24	0.05	0.243	3.663	4
3.643	0.504	0.25	0.03	0.248	3.698	4

OBSERVED DISTANCE VALUES=   8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE =   8.3742 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.1

DENSITY FIELD   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 0.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.180	2.075	1.007	1.234	2
1.183	1.874	1.113	1.194	2
1.192	1.687	1.143	1.192	2
1.175	1.504	1.082	1.193	2

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.167	1.328	1.007	1.163	5
1.186	0.954	1.037	1.200	4
1.179	0.778	1.111	1.198	1
1.168	0.590	1.084	1.166	1

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.151	0.394	1.044	1.163	1
1.144	0.204	1.005	1.199	1

AVERAGE DENSITIES AT SCALED TIME= 0.600 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.209	2.095	1.218	1.265	2
1.217	1.879	1.383	1.229	2
1.224	1.689	1.425	1.224	2
1.211	1.499	1.340	1.230	2

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.205	1.325	1.300	1.220	5
1.206	1.143	1.157	1.206	5
1.212	0.950	1.191	1.225	4
1.209	0.783	1.327	1.229	1

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.199	0.591	1.296	1.200	1
1.183	0.388	1.261	1.196	1
1.175	0.195	1.159	1.232	1

AVERAGE DENSITIES AT SCALED TIME= 0.700 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.238	2.095	1.562	1.296	2
1.248	1.885	1.819	1.260	2
1.254	1.692	1.909	1.254	2
1.245	1.494	1.775	1.264	2

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.245	1.326	1.846	1.259	5
1.242	1.147	1.490	1.242	5
1.243	0.968	1.460	1.254	4
1.239	0.790	1.648	1.259	1

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.230	0.592	1.643	1.231	1
1.214	0.383	1.621	1.228	1
1.210	0.186	1.395	1.267	1

AVERAGE DENSITIES AT SCALED TIME= 0.800 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.267	2.105	2.115	1.326	2
1.282	1.890	2.374	1.294	2
1.287	1.694	2.544	1.288	2
1.278	1.491	2.479	1.297	2
1.260	1.327	2.881	1.294	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.276	1.149	2.055	1.276	5
1.273	0.976	1.901	1.283	4
1.269	0.796	2.255	1.290	1
1.260	0.593	2.309	1.261	1
1.244	0.378	2.305	1.258	1

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.242	0.178	1.758	1.301	1
1.497	2.076	1.017	1.541	2
1.508	1.868	1.026	1.516	2
1.510	1.676	1.030	1.511	2
1.517	1.502	1.018	1.532	2

AVERAGE DENSITIES AT SCALED TIME= 0.900 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.307	2.115	2.393	1.367	2
1.331	1.898	2.265	1.344	2
1.339	1.696	2.286	1.379	2
1.327	1.492	2.509	1.345	2
1.330	1.326	3.711	1.344	5
1.321	1.154	2.394	1.321	5
1.310	0.977	2.233	1.320	4
1.316	0.790	2.539	1.335	1

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.311	0.588	2.302	1.311	1
1.291	0.375	2.603	1.305	1
1.277	0.171	2.226	1.336	1
1.515	2.082	1.125	1.559	2
1.532	1.871	1.169	1.540	2
1.536	1.677	1.195	1.537	2
1.537	1.499	1.122	1.579	5
1.543	1.330	1.161	1.555	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.540	1.145	1.059	1.540	5
1.540	0.948	1.058	1.551	4
1.540	0.763	1.109	1.553	1
1.545	0.579	1.114	1.545	1
1.531	0.394	1.094	1.541	1
1.517	0.207	1.045	1.559	1

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.2

DENSITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.348	2.130	2.286	1.411	2	1.359	0.785	2.350	1.336	1	1.575	1.337	1.472	1.587	5
1.376	1.905	2.151	1.389	2	1.362	0.583	2.133	1.363	1	1.575	1.145	1.267	1.575	5
1.385	1.698	2.077	1.386	2	1.344	0.370	2.435	1.358	1	1.573	0.943	1.338	1.585	4
1.376	1.493	2.320	1.394	2	1.535	2.089	1.284	1.581	2	1.568	0.762	1.317	1.580	1
1.391	1.331	3.449	1.404	5	1.553	1.875	1.358	1.562	2	1.571	0.577	1.285	1.571	1
1.388	1.157	1.968	1.388	5	1.561	1.678	1.414	1.561	2	1.557	0.391	1.256	1.566	1
1.367	0.977	1.909	1.376	4	1.564	1.500	1.349	1.505	5	1.533	0.203	1.154	1.575	1

AVERAGE DENSITIES AT SCALED TIME= 1.300 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.451	2.166	1.896	1.520	2	1.623	1.886	2.057	1.632	2	1.609	0.197	2.257	1.621	3
1.487	1.926	1.810	1.502	2	1.634	1.686	2.319	1.634	2	1.807	2.081	1.060	1.844	2
1.502	1.707	1.645	1.502	2	1.645	1.502	2.155	1.684	5	1.814	1.882	1.103	1.822	2
1.501	1.490	1.727	1.518	2	1.672	1.350	3.020	1.686	5	1.824	1.690	1.111	1.824	2
1.509	0.981	1.290	1.518	4	1.687	1.139	2.765	1.687	4	1.837	1.512	1.117	1.674	5
1.501	0.778	1.881	1.516	1	1.670	0.926	2.838	1.683	4	1.853	1.324	1.136	1.862	5
1.468	0.571	1.720	1.498	1	1.644	0.758	2.395	1.638	4	1.856	1.139	1.108	1.855	4
1.485	0.354	1.999	1.500	1	1.642	0.573	2.348	1.642	1	1.863	0.950	1.105	1.872	4
1.563	2.105	1.964	1.646	2	1.627	0.382	2.270	1.637	1	1.861	0.768	1.074	1.898	4

AVERAGE DENSITIES AT SCALED TIME= 1.400 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.480	2.177	1.770	1.550	2	1.670	1.692	2.190	1.670	2	1.834	1.885	1.310	1.842	2
1.518	1.933	1.705	1.534	2	1.684	1.506	1.913	1.724	5	1.844	1.692	1.333	1.844	2
1.534	1.711	1.546	1.534	2	1.717	1.355	2.460	1.731	5	1.859	1.519	1.380	1.898	5
1.533	1.491	1.661	1.573	5	1.736	1.139	2.375	1.736	4	1.879	1.328	1.439	1.888	5
1.548	0.934	1.158	1.556	4	1.718	0.919	2.628	1.732	4	1.883	1.139	1.352	1.883	4
1.537	0.777	1.751	1.552	1	1.683	0.755	2.382	1.726	4	1.888	0.945	1.327	1.898	4
1.537	0.563	1.606	1.537	1	1.672	0.572	2.760	1.673	1	1.880	0.762	1.254	1.918	4
1.525	0.350	1.874	1.541	1	1.658	0.378	2.591	1.668	1	1.874	0.578	1.091	1.874	1
1.630	2.112	1.907	1.678	2	1.645	0.197	2.634	1.657	3	1.860	0.390	1.060	1.900	3
1.659	1.890	1.905	1.668	2	1.823	2.084	1.198	1.860	2	1.338	0.201	1.096	1.849	3

AVERAGE DENSITIES AT SCALED TIME= 1.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.506	2.185	1.653	1.578	2	1.704	1.697	2.027	1.704	2	1.903	1.331	1.937	1.913	5
1.546	1.939	1.609	1.562	2	1.762	0.912	2.421	1.777	4	1.908	1.139	1.750	1.908	4
1.553	1.715	1.461	1.563	2	1.724	0.750	2.159	1.767	4	1.911	0.940	1.660	1.922	4
1.584	0.987	1.049	1.591	4	1.712	0.570	2.754	1.712	1	1.903	0.757	1.541	1.941	4
1.571	0.777	1.634	1.612	4	1.698	0.375	2.517	1.708	1	1.895	0.574	1.308	1.977	4
1.574	0.565	1.503	1.574	1	1.838	2.087	1.378	1.876	2	1.879	0.391	1.221	1.920	3
1.565	0.346	1.757	1.580	1	1.853	1.888	1.593	1.861	2	1.361	0.200	1.318	1.872	3
1.660	2.118	1.845	1.709	2	1.863	1.695	1.643	1.863	2					
1.692	1.894	1.778	1.702	2	1.881	1.525	1.804	1.921	5					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.3

DENSITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.612	2.226	1.238	1.692	2
1.656	1.971	1.251	1.676	2
1.674	1.735	1.192	1.675	2
1.704	0.786	1.213	1.740	4
1.725	0.559	1.139	1.725	1
1.737	2.154	1.515	1.841	2
1.826	1.921	1.365	1.837	2
1.847	1.715	1.322	1.847	2
1.940	0.893	1.625	1.956	4
1.888	0.735	1.506	1.931	4
1.890	0.549	1.974	1.890	1
1.879	0.355	1.929	1.912	3

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.954	2.113	1.652	1.994	2
1.979	1.918	2.069	1.989	2
2.012	1.722	1.938	2.095	5
2.057	1.559	1.851	2.079	5
2.081	1.357	1.964	2.093	5
2.071	1.135	1.663	2.091	4
2.087	0.912	1.619	2.100	4
2.068	0.723	1.934	2.110	4
2.043	0.553	2.073	2.126	4
2.019	0.373	2.432	2.053	3
2.008	0.194	2.149	2.017	3
2.099	2.071	1.697	2.130	2

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.114	1.888	1.760	2.122	2
2.140	1.714	2.289	2.216	5
2.172	1.525	2.530	2.206	5
2.188	1.336	2.441	2.197	5
2.202	1.140	2.181	2.202	5
2.204	0.943	2.573	2.213	4
2.191	0.756	2.392	2.224	4
2.176	0.558	1.882	2.252	4
2.156	0.377	1.707	2.188	3
2.140	0.194	1.505	2.149	3

AVERAGE DENSITIES AT SCALED TIME= 2.100 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.630	2.233	1.183	1.711	2
1.674	1.976	1.202	1.694	2
1.692	1.739	1.159	1.692	2
1.725	0.790	1.155	1.760	4
1.749	0.558	1.090	1.749	1
1.808	2.161	1.456	1.863	2
1.847	1.927	1.311	1.859	2
1.868	1.718	1.248	1.868	2
1.969	0.891	1.519	1.984	4
1.914	0.734	1.429	1.957	4
1.920	0.547	1.870	1.920	1
1.910	0.352	1.825	1.942	3
1.979	2.120	1.584	2.020	2
2.005	1.925	1.943	2.016	2
2.040	1.728	1.786	2.123	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.087	1.564	1.723	2.130	5
2.112	1.361	1.832	2.124	5
2.123	1.135	1.556	2.123	4
2.120	0.907	1.729	2.133	4
2.101	0.717	1.874	2.142	4
2.076	0.548	2.002	2.158	4
2.053	0.368	2.395	2.086	3
2.043	0.192	2.003	2.052	3
2.114	2.075	2.145	2.144	2
2.134	1.891	2.085	2.141	2
2.167	1.722	2.473	2.244	5
2.201	1.530	2.743	2.235	5
2.217	1.339	2.591	2.226	5
2.231	1.141	2.296	2.231	5
2.233	0.941	2.895	2.242	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.219	0.752	2.664	2.252	4
2.197	0.555	2.356	2.273	4
2.175	0.374	2.261	2.207	3
2.162	0.193	1.921	2.170	3
2.328	1.886	1.056	2.446	5
2.352	1.698	1.074	2.418	5
2.376	1.520	1.085	2.406	5
2.395	1.345	1.083	2.404	5
2.401	1.161	1.091	2.402	5
2.409	0.969	1.095	2.415	4
2.392	0.780	1.062	2.419	4
2.380	0.593	1.053	2.442	4
2.380	0.403	1.005	2.414	3
2.355	0.209	1.020	2.365	3

AVERAGE DENSITIES AT SCALED TIME= 2.200 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.647	2.240	1.136	1.729	2
1.690	1.982	1.159	1.711	2
1.708	1.743	1.130	1.709	2
1.744	0.793	1.104	1.778	4
1.772	0.559	1.048	1.772	1
1.828	2.168	1.401	1.884	2
1.867	1.933	1.264	1.880	2
1.995	0.899	1.428	2.011	4
1.939	0.734	1.363	1.981	4
1.947	0.545	1.790	2.035	4
1.939	0.350	1.722	1.970	3
2.052	2.127	1.522	2.045	2
2.029	1.932	1.832	2.041	2
2.141	1.364	1.717	2.153	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.153	1.135	1.465	2.153	4
2.151	0.904	1.642	2.164	4
2.131	0.712	1.801	2.174	4
2.108	0.543	1.921	2.190	4
2.086	0.362	2.269	2.117	3
2.076	0.189	1.833	2.085	3
2.135	2.080	2.366	2.166	2
2.161	1.897	2.104	2.169	2
2.201	1.731	2.213	2.279	5
2.236	1.537	2.376	2.271	5
2.254	1.343	2.243	2.263	5
2.269	1.142	1.983	2.268	5
2.269	0.939	2.633	2.278	4
2.255	0.748	2.410	2.288	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.233	0.549	2.238	2.309	4
2.211	0.370	2.280	2.241	3
2.193	0.192	2.142	2.201	3
2.323	2.075	1.064	2.351	2
2.343	1.892	1.202	2.461	5
2.371	1.704	1.243	2.437	5
2.396	1.524	1.274	2.427	5
2.415	1.347	1.275	2.424	5
2.423	1.161	1.299	2.423	5
2.429	0.969	1.305	2.435	4
2.410	0.779	1.204	2.437	4
2.401	0.590	1.217	2.462	4
2.397	0.401	1.140	2.430	3
2.369	0.208	1.135	2.378	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
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DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

AD-A051 288 VICTORIA UNIV (BRITISH COLUMBIA) F/G 18/3
PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOT--ETC(U)
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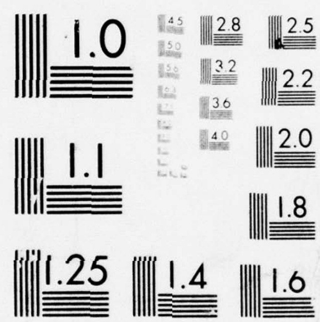

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE 8.4

DENSITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 2.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.693	2.258	1.029	1.779	2	2.230	1.137	1.260	2.230	4	2.336	0.531	1.839	2.413	4
1.735	1.996	1.063	1.758	2	2.233	0.895	1.412	2.247	4	2.313	0.359	1.964	2.340	3
1.752	1.754	1.064	1.753	2	2.216	0.699	1.565	2.259	4	2.287	0.182	2.281	2.294	3
1.797	0.806	0.983	1.827	4	2.191	0.531	1.590	2.273	4	2.367	2.091	1.620	2.397	2
1.833	0.562	0.949	1.833	1	2.172	0.348	1.919	2.199	3	2.391	1.908	2.103	2.512	5
1.882	2.188	1.262	1.941	2	2.166	0.178	1.692	2.173	3	2.421	1.718	2.251	2.469	5
1.919	1.948	1.152	1.934	2	2.214	2.103	1.887	2.248	2	2.449	1.535	2.357	2.480	5
2.066	0.897	1.224	2.081	4	2.244	1.923	1.621	2.377	5	2.467	1.355	2.491	2.477	5
2.003	0.736	1.216	2.043	4	2.289	1.753	1.731	2.370	5	2.478	1.162	2.629	2.478	5
2.017	0.541	1.596	2.104	4	2.327	1.555	1.728	2.364	5	2.480	0.967	2.560	2.486	4
2.012	0.742	1.529	2.041	3	2.347	1.354	1.691	2.357	5	2.461	0.774	2.101	2.488	4
2.066	2.150	1.365	2.111	2	2.362	1.144	1.451	2.362	5	2.460	0.583	2.180	2.522	4
2.093	1.950	1.570	2.106	2	2.365	0.936	2.077	2.373	4	2.449	0.392	2.065	2.480	3
2.213	1.373	1.451	2.225	5	2.352	0.736	1.941	2.386	4	2.413	0.202	1.779	2.422	3

AVERAGE DENSITIES AT SCALED TIME= 2.600 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.703	2.264	1.003	1.794	2	2.197	0.345	1.840	2.224	3	2.511	1.166	2.331	2.512	5
1.749	2.001	1.040	1.772	2	2.193	0.175	1.644	2.200	3	2.512	0.957	2.442	2.518	4
1.766	1.757	1.047	1.766	2	2.237	2.110	1.764	2.272	2	2.493	0.771	1.984	2.520	4
1.813	0.810	0.951	1.842	4	2.268	1.930	1.519	2.402	5	2.492	0.580	2.209	2.554	4
1.850	0.564	0.924	1.850	1	2.314	1.760	1.629	2.396	5	2.460	0.386	2.110	2.511	3
1.897	2.195	1.224	1.958	2	2.353	1.561	1.596	2.391	5	2.441	0.200	1.851	2.449	3
1.935	1.953	1.123	1.950	2	2.373	1.357	1.538	2.383	5	2.595	2.077	1.112	2.760	5
2.086	0.888	1.175	2.101	4	2.389	1.146	1.345	2.389	5	2.608	1.881	1.132	2.712	5
2.022	0.737	1.179	2.061	4	2.393	0.935	1.942	2.401	4	2.639	1.704	1.145	2.699	5
2.038	0.540	1.541	2.123	4	2.382	0.733	1.842	2.416	4	2.662	1.531	1.145	2.691	5
2.033	0.340	1.490	2.061	3	2.367	0.526	1.761	2.445	4	2.670	1.359	1.154	2.679	5
2.085	2.157	1.320	2.131	2	2.344	0.356	1.849	2.370	3	2.684	1.165	1.137	2.684	5
2.111	1.955	1.502	2.125	2	2.317	0.179	2.162	2.324	3	2.676	0.970	1.137	2.681	4
2.233	1.376	1.394	2.246	5	2.390	2.100	1.659	2.422	2	2.669	0.776	1.132	2.693	4
2.252	1.139	1.208	2.252	4	2.421	1.918	2.001	2.543	5	2.669	0.602	1.152	2.722	4
2.258	0.893	1.348	2.271	4	2.453	1.729	2.062	2.523	5	2.653	0.399	1.133	2.683	3
2.242	0.696	1.491	2.285	4	2.482	1.542	2.124	2.515	5	2.632	0.204	1.089	2.639	3
2.215	0.528	1.495	2.298	4	2.502	1.360	2.215	2.511	5					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
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DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.5

DENSITY FIELD   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.761	2.285	0.930	1.851	2	2.440	1.578	1.267	2.480	5	2.748	1.369	1.967	2.758	5
1.799	2.016	0.980	1.825	2	2.458	1.369	1.336	2.469	5	2.759	1.170	1.821	2.759	5
1.815	1.759	1.001	1.816	2	2.478	1.151	1.083	2.478	5	2.752	0.970	1.328	2.757	4
1.869	0.829	0.854	1.895	4	2.489	0.933	1.550	2.497	4	2.743	0.771	1.773	2.767	4
1.910	0.574	0.855	1.992	4	2.484	0.719	1.590	2.519	4	2.741	0.598	1.932	2.793	4
1.953	2.219	1.109	2.017	2	2.483	2.139	1.445	2.520	2	2.723	0.392	2.067	2.751	3
1.989	1.970	1.032	2.006	2	2.523	1.954	1.590	2.652	5	2.694	0.191	1.828	2.701	3
2.158	0.891	1.045	2.172	4	2.561	1.762	1.538	2.635	5	2.852	2.073	1.067	3.001	5
2.086	0.746	1.076	2.123	4	2.593	1.564	1.554	2.628	5	2.865	1.885	1.090	2.980	5
2.105	0.543	1.384	2.187	4	2.614	1.375	1.592	2.624	5	2.912	1.704	1.076	2.966	5
2.103	0.336	1.308	2.130	3	2.623	1.175	1.747	2.623	5	2.911	1.525	1.112	2.937	5
2.150	2.184	1.163	2.201	2	2.624	0.965	1.935	2.630	4	2.907	1.351	1.172	2.915	5
2.174	1.974	1.297	2.190	2	2.605	0.759	1.607	2.632	4	2.916	1.167	1.118	2.916	5
2.302	1.387	1.205	2.316	5	2.608	0.567	2.164	2.670	4	2.931	0.973	1.122	2.936	4
2.325	1.143	1.055	2.325	5	2.600	0.374	1.978	2.627	3	2.916	0.785	1.152	2.937	4
2.342	0.888	1.150	2.355	4	2.557	0.189	1.898	2.564	3	2.890	0.585	1.129	2.943	4
2.331	0.688	1.258	2.374	4	2.554	2.103	1.714	2.824	5	2.884	0.388	1.087	2.910	3
2.316	2.140	1.407	2.355	2	2.676	1.908	1.942	2.784	5	2.888	0.195	1.047	2.895	3
2.346	1.955	1.269	2.484	5	2.711	1.726	1.902	2.775	5					
2.399	1.783	1.360	2.484	5	2.736	1.547	1.938	2.767	5					

AVERAGE DENSITIES AT SCALED TIME= 3.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.818	2.308	0.882	1.913	2	2.580	0.932	1.313	2.538	4	2.861	0.378	1.835	2.886	3
1.858	2.031	0.957	1.886	2	2.582	0.709	1.431	2.618	4	2.836	0.174	1.732	2.842	3
1.873	1.778	0.962	1.874	2	2.572	2.171	1.199	2.772	5	2.900	2.092	1.707	3.053	5
1.931	0.854	0.779	1.951	4	2.620	1.986	1.256	2.753	5	2.935	1.901	1.837	3.033	5
1.967	0.591	0.812	2.042	4	2.661	1.789	1.208	2.739	5	2.964	1.717	1.830	3.020	5
2.009	2.241	1.033	2.078	2	2.692	1.580	1.237	2.728	5	2.973	1.533	1.623	2.999	5
2.047	1.984	0.957	2.065	2	2.714	1.384	1.272	2.725	5	2.984	1.359	1.733	2.992	5
2.230	0.898	0.973	2.243	4	2.725	1.180	1.405	2.725	5	2.998	1.170	1.673	2.998	5
2.151	0.761	1.009	2.194	4	2.730	0.962	1.506	2.736	4	3.009	0.973	1.698	3.013	4
2.165	0.555	1.263	2.243	4	2.714	0.749	1.330	2.741	4	3.001	0.787	1.853	3.021	4
2.165	0.341	1.149	2.193	3	2.726	0.556	1.946	2.788	4	2.982	0.581	1.927	3.034	4
2.214	2.210	1.011	2.269	2	2.724	0.358	1.555	2.748	3	2.973	0.380	2.136	2.997	3
2.237	1.992	1.156	2.254	2	2.751	2.139	1.897	2.928	5	2.967	0.186	2.054	2.972	3
2.422	0.836	1.010	2.436	4	2.784	1.943	1.948	2.898	5	3.125	1.518	1.116	3.148	5
2.417	0.656	1.098	2.459	4	2.822	1.753	1.773	2.838	5	3.128	1.343	1.288	3.135	5
2.391	2.169	1.177	2.434	2	2.844	1.566	1.912	2.876	5	3.130	1.166	1.296	3.130	5
2.419	1.978	1.164	2.561	5	2.859	1.377	1.811	2.869	5	3.139	0.984	1.319	3.143	4
2.430	1.806	1.183	2.568	5	2.873	1.175	1.723	2.873	5	3.127	0.775	1.332	3.148	4
2.522	1.595	1.079	2.563	5	2.868	0.970	1.695	2.873	4	3.106	0.575	1.288	3.156	4
2.537	1.378	1.158	2.549	5	2.864	0.765	1.560	2.888	4	3.107	0.403	1.240	3.133	3
2.561	1.156	0.928	2.561	5	2.871	0.589	1.626	2.923	4	3.099	0.203	1.149	3.106	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.6

DENSITY FIELD   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 4.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.869	2.327	0.866	1.968	2
1.914	2.042	0.955	1.942	2
1.927	1.786	0.930	1.929	2
1.984	0.876	0.734	2.001	4
2.010	0.611	0.795	2.078	4
2.057	2.258	1.007	2.128	2
2.098	1.993	0.903	2.117	2
2.291	0.907	0.946	2.303	4
2.204	0.777	0.972	2.233	4
2.208	0.571	1.178	2.280	4
2.210	0.352	1.041	2.238	3
2.265	2.228	0.903	2.322	2
2.239	2.006	1.094	2.308	2
2.465	0.889	0.945	2.498	4
2.481	0.690	1.037	2.521	4
2.448	2.188	1.095	2.493	2
2.477	1.995	1.192	2.621	5
2.542	1.824	1.085	2.633	5
2.586	1.609	0.997	2.628	5
2.600	1.385	1.022	2.612	5
2.627	1.160	0.854	2.627	5
2.648	0.933	1.201	2.656	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.654	0.708	1.330	2.698	4
2.636	2.190	1.047	2.839	5
2.691	2.007	1.093	2.828	5
2.735	1.807	1.047	2.815	5
2.766	1.592	1.094	2.803	5
2.789	1.392	1.126	2.800	5
2.801	1.182	1.276	2.801	5
2.807	0.961	1.311	2.813	4
2.794	0.745	1.196	2.822	4
2.818	0.554	1.741	2.878	4
2.834	2.167	1.736	3.016	5
2.876	1.970	1.538	2.994	5
2.912	1.772	1.457	2.980	5
2.930	1.582	1.639	2.964	5
2.946	1.379	1.477	2.956	5
2.961	1.171	1.564	2.961	5
2.960	0.970	1.437	2.965	4
2.959	0.761	1.319	2.983	4
2.974	0.587	1.442	3.025	4
2.972	0.376	1.790	2.996	3
2.955	0.170	1.648	2.960	3
2.994	2.122	1.636	3.151	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.040	1.932	1.639	3.142	5
3.070	1.745	1.543	3.129	5
3.072	1.548	1.483	3.100	5
3.080	1.360	1.339	3.088	5
3.104	1.170	1.452	3.105	5
3.116	0.973	1.475	3.120	4
3.114	0.784	1.551	3.134	4
3.099	0.575	1.575	3.150	4
3.091	0.375	1.924	3.114	3
3.090	0.181	1.705	3.095	3
3.133	2.094	1.864	3.275	5
3.172	1.917	2.149	3.266	5
3.196	1.728	1.621	3.250	5
3.203	1.523	1.421	3.226	5
3.217	1.346	1.655	3.224	5
3.225	1.168	1.717	3.226	5
3.234	0.986	1.827	3.238	4
3.228	0.774	1.757	3.249	4
3.209	0.568	1.707	3.259	4
3.205	0.396	1.726	3.229	3
3.197	0.192	1.985	3.203	3

AVERAGE DENSITIES AT SCALED TIME= 4.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.964	2.051	0.939	1.993	2
1.977	1.794	0.895	1.979	2
2.029	0.896	0.703	2.043	4
2.043	0.629	0.785	2.106	4
2.101	2.270	1.008	2.173	2
2.147	2.000	0.857	2.166	2
2.343	0.917	0.908	2.354	4
2.249	0.792	0.942	2.275	4
2.240	0.537	1.110	2.307	4
2.242	0.365	0.969	2.272	3
2.308	2.240	0.836	2.368	2
2.337	2.019	1.079	2.357	2
2.539	0.895	0.918	2.549	4
2.530	0.697	1.023	2.568	4
2.492	2.198	1.109	2.538	2
2.527	2.010	1.294	2.673	5
2.595	1.842	1.036	2.699	5
2.641	1.623	0.957	2.685	5
2.658	1.392	0.916	2.670	5
2.683	1.165	0.822	2.683	5
2.703	0.938	1.151	2.711	4
2.709	0.715	1.246	2.742	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.683	2.203	0.971	2.887	5
2.745	2.024	1.023	2.885	5
2.792	1.823	0.970	2.875	5
2.826	1.604	1.028	2.864	5
2.849	1.400	1.052	2.861	5
2.862	1.184	1.244	2.862	5
2.866	0.964	1.261	2.871	4
2.855	0.749	1.139	2.881	4
2.891	0.561	1.616	2.948	4
2.899	2.190	1.492	3.084	5
2.944	1.990	1.307	3.065	5
2.980	1.789	1.279	3.050	5
2.998	1.597	1.445	3.033	5
3.014	1.385	1.254	3.024	5
3.027	1.171	1.414	3.027	5
3.029	0.970	1.275	3.034	4
3.032	0.762	1.174	3.055	4
3.057	0.591	1.304	3.105	4
3.059	0.380	1.703	3.083	3
3.049	0.167	1.560	3.053	3
3.072	2.150	1.445	3.235	5
3.123	1.952	1.457	3.227	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.153	1.763	1.361	3.214	5
3.148	1.560	1.405	3.176	5
3.157	1.365	1.128	3.165	5
3.187	1.172	1.300	3.187	5
3.200	0.976	1.292	3.204	4
3.202	0.785	1.387	3.222	4
3.192	0.575	1.399	3.242	4
3.184	0.370	1.641	3.206	3
3.189	0.172	1.458	3.193	3
3.218	2.119	1.736	3.364	5
3.267	1.942	1.799	3.364	5
3.289	1.744	1.298	3.344	5
3.287	1.532	1.266	3.310	5
3.305	1.354	1.514	3.312	5
3.323	1.174	1.383	3.323	5
3.335	0.990	1.450	3.338	4
3.329	0.776	1.454	3.349	4
3.311	0.564	1.518	3.360	4
3.309	0.384	1.431	3.331	3
3.310	0.182	1.799	3.315	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.7

DENSITY FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.004	2.060	0.882	2.034	2	2.736	0.725	1.172	2.787	4	3.131	2.171	1.295	3.297	5
2.019	1.803	0.853	2.021	2	2.721	2.214	0.940	2.926	5	3.183	1.968	1.347	3.289	5
2.061	0.912	0.675	2.073	4	2.791	2.039	0.935	2.933	5	3.213	1.779	1.247	3.276	5
2.069	0.644	0.768	2.127	4	2.841	1.838	0.932	2.926	5	3.208	1.574	1.352	3.237	5
2.140	2.231	1.010	2.214	2	2.878	1.618	0.993	2.918	5	3.220	1.376	1.001	3.229	5
2.191	2.008	0.814	2.211	2	2.902	1.409	1.008	2.914	5	3.250	1.179	1.136	3.251	5
2.389	0.927	0.849	2.398	4	2.915	1.189	1.257	2.915	5	3.263	0.980	1.176	3.266	4
2.285	0.805	0.905	2.309	4	2.916	0.972	1.280	2.921	4	3.270	0.791	1.300	3.288	4
2.265	0.601	1.055	2.328	4	2.905	0.759	1.111	2.930	4	3.267	0.583	1.266	3.314	4
2.266	0.375	0.924	2.297	3	2.950	0.574	1.555	3.003	4	3.261	0.371	1.523	3.282	3
2.347	2.251	0.807	2.408	2	2.949	2.209	1.330	3.138	5	3.263	0.169	1.596	3.268	3
2.392	2.033	1.083	2.403	2	2.995	2.007	1.250	3.118	5	3.282	2.142	1.535	3.432	5
2.585	0.902	0.894	2.596	4	3.033	1.806	1.219	3.105	5	3.333	1.960	1.716	3.432	5
2.572	0.705	1.010	2.608	4	3.054	1.611	1.352	3.090	5	3.355	1.756	1.197	3.411	5
2.528	2.205	1.186	2.576	2	3.070	1.395	1.154	3.080	5	3.354	1.546	1.185	3.379	5
2.572	2.025	1.399	2.721	5	3.080	1.177	1.310	3.080	5	3.377	1.368	1.433	3.385	5
2.644	1.859	1.030	2.740	5	3.082	0.975	1.218	3.086	4	3.398	1.183	1.191	3.398	5
2.692	1.639	0.928	2.738	5	3.088	0.771	1.103	3.110	4	3.409	0.994	1.270	3.412	4
2.712	1.402	0.554	2.725	5	3.123	0.602	1.201	3.168	4	3.407	0.782	1.315	3.426	4
2.735	1.171	0.815	2.736	5	3.132	0.385	1.468	3.155	3	3.394	0.568	1.369	3.442	4
2.752	0.947	1.118	2.759	4	3.125	0.172	1.435	3.129	3	3.391	0.383	1.219	3.412	3

AVERAGE DENSITIES AT SCALED TIME= 5.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.031	2.059	0.792	2.062	2	2.798	0.960	1.074	2.804	4	3.176	2.188	1.219	3.344	5
2.048	1.815	0.811	2.051	2	2.800	0.735	1.112	2.829	4	3.229	1.984	1.283	3.338	5
2.079	0.925	0.644	2.089	4	2.756	2.227	0.931	2.964	5	3.260	1.796	1.180	3.325	5
2.086	0.655	0.736	2.141	4	2.831	2.056	0.940	2.976	5	3.256	1.589	1.277	3.287	5
2.173	2.293	0.995	2.249	2	2.886	1.855	0.906	2.974	5	3.273	1.389	0.948	3.282	5
2.230	2.019	0.774	2.251	2	2.926	1.633	0.968	2.968	5	3.300	1.190	1.018	3.300	5
2.425	0.935	0.771	2.434	4	2.949	1.420	0.976	2.962	5	3.312	0.989	1.120	3.315	4
2.313	0.815	0.860	2.335	4	2.961	1.200	1.267	2.962	5	3.325	0.803	1.241	3.342	4
2.284	0.611	1.015	2.344	4	2.954	0.986	1.238	2.967	4	3.329	0.595	1.157	3.373	4
2.286	0.379	0.896	2.317	3	2.951	0.772	1.072	2.973	4	3.332	2.160	1.412	3.486	5
2.379	2.264	0.799	2.442	2	3.001	0.588	1.572	3.050	4	3.385	1.977	1.651	3.468	5
2.424	2.050	1.082	2.589	5	2.991	2.227	1.275	3.183	5	3.410	1.774	1.094	3.468	5
2.628	0.909	0.848	2.638	4	3.036	2.026	1.270	3.163	5	3.409	1.564	1.070	3.436	5
2.611	0.712	0.967	2.646	4	3.077	1.824	1.205	3.152	5	3.435	1.392	1.351	3.444	5
2.561	2.215	1.285	2.609	2	3.102	1.625	1.314	3.140	5	3.455	1.192	1.098	3.455	5
2.612	2.041	1.422	2.764	5	3.116	1.408	1.137	3.128	5	3.465	1.001	1.215	3.468	4
2.688	1.876	1.067	2.788	5	3.125	1.189	1.277	3.126	5	3.470	0.791	1.240	3.487	4
2.740	1.656	0.891	2.798	5	3.128	0.986	1.225	3.131	4	3.463	0.578	1.242	3.509	4
2.762	1.416	0.843	2.776	5	3.136	0.783	1.062	3.156	4	3.458	0.390	1.081	3.480	3
2.783	1.181	0.825	2.784	5	3.178	0.617	1.140	3.220	4					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.8

DENSITY FIELD   DIPOLE WEST/10   *F5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE DENSITIES AT SCALED TIME= 6.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.046	2.060	0.714	2.079	2
2.065	1.828	0.775	2.069	2
2.082	0.935	0.611	2.092	4
2.095	0.663	0.695	2.148	4
2.259	2.032	0.746	2.232	2
2.450	0.943	0.688	2.458	4
2.329	0.822	0.811	2.350	4
2.295	0.615	0.990	2.354	4
2.299	0.380	0.882	2.331	3
2.401	2.280	0.777	2.467	2
2.458	2.057	1.054	2.628	5
2.664	0.916	0.773	2.673	4
2.645	0.715	0.891	2.679	4
2.689	2.228	1.334	2.640	2
2.647	2.054	1.348	2.801	5
2.729	1.891	1.143	2.831	5
2.783	1.672	0.845	2.834	5
2.805	1.434	0.870	2.821	5
2.824	1.194	0.834	2.825	5
2.840	0.974	1.012	2.844	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.842	0.742	1.060	2.870	4
2.791	2.242	0.930	3.001	5
2.869	2.073	0.868	3.017	5
2.929	1.872	0.830	3.019	5
2.970	1.648	0.937	3.014	5
2.990	1.431	0.940	3.004	5
3.003	1.215	1.232	3.004	5
3.010	1.003	1.225	3.013	4
2.993	0.783	1.004	3.014	4
3.045	0.598	1.609	3.093	4
3.029	2.246	1.292	3.226	5
3.077	2.046	1.261	3.205	5
3.119	1.841	1.176	3.197	5
3.145	1.636	1.283	3.184	5
3.158	1.420	1.162	3.170	5
3.169	1.205	1.305	3.170	5
3.172	1.002	1.238	3.175	4
3.180	0.795	1.015	3.195	4
3.224	0.630	1.121	3.264	4
3.215	2.205	1.213	3.387	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.270	2.003	1.247	3.383	5
3.301	1.814	1.170	3.369	5
3.296	1.603	1.238	3.328	5
3.315	1.400	0.980	3.325	5
3.342	1.205	0.985	3.342	5
3.356	1.003	1.103	3.358	4
3.373	0.818	1.180	3.388	4
3.380	0.608	1.078	3.421	4
3.374	2.178	1.357	3.531	5
3.431	1.995	1.566	3.536	5
3.456	1.793	0.994	3.518	5
3.453	1.580	0.940	3.481	5
3.480	1.392	1.244	3.489	5
3.500	1.201	1.046	3.501	5
3.513	1.011	1.178	3.515	4
3.524	0.804	1.163	3.540	4
3.521	0.589	1.141	3.563	4
3.516	0.398	0.976	3.539	3

AVERAGE DENSITIES AT SCALED TIME= 6.500 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.053	2.092	0.692	2.088	2
2.073	1.838	0.749	2.077	2
2.076	0.943	0.587	2.085	4
2.091	0.667	0.663	2.143	4
2.273	2.044	0.749	2.297	2
2.459	0.950	0.625	2.466	4
2.332	0.827	0.770	2.353	4
2.295	0.619	0.969	2.354	4
2.302	0.382	0.881	2.334	3
2.490	2.075	0.975	2.651	5
2.636	0.922	0.669	2.694	4
2.666	0.716	0.818	2.699	4
2.613	2.239	1.258	2.656	2
2.675	2.062	1.281	2.830	5
2.763	1.899	1.223	2.866	5
2.820	1.684	0.808	2.873	5
2.838	1.446	0.873	2.854	5
2.854	1.205	0.909	2.855	5
2.870	0.983	0.955	2.875	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.873	0.744	0.925	2.900	4
2.822	2.253	0.937	3.034	5
2.900	2.085	0.759	3.051	5
2.958	1.854	0.853	3.060	5
3.010	1.660	0.909	3.055	5
3.027	1.442	0.873	3.042	5
3.038	1.230	1.138	3.040	5
3.048	1.016	1.102	3.051	4
3.029	0.788	0.914	3.049	4
3.082	0.601	1.634	3.129	4
3.065	2.264	1.271	3.265	5
3.118	2.064	1.178	3.253	5
3.160	1.856	1.126	3.240	5
3.187	1.646	1.247	3.227	5
3.198	1.431	1.198	3.211	5
3.213	1.222	1.295	3.214	5
3.215	1.018	1.179	3.217	4
3.220	0.803	0.958	3.237	4
3.261	0.639	1.125	3.299	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.253	2.225	1.231	3.430	5
3.311	2.020	1.221	3.425	5
3.340	1.828	1.194	3.410	5
3.330	1.611	1.270	3.364	5
3.352	1.410	1.084	3.363	5
3.381	1.219	1.027	3.382	5
3.398	1.018	1.080	3.400	4
3.415	0.830	1.132	3.429	4
3.420	0.619	1.020	3.459	4
3.412	2.195	1.347	3.572	5
3.470	2.011	1.510	3.578	5
3.493	1.806	0.931	3.556	5
3.487	1.589	0.873	3.516	5
3.516	1.401	1.190	3.526	5
3.539	1.212	1.025	3.540	5
3.556	1.023	1.143	3.558	4
3.570	0.817	1.087	3.585	4
3.566	0.598	1.062	3.606	4

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.1

PRESSURE FIELD   DIPOLE WEST/10   WFS/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 0.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.190	2.075	0.395	1.234	2
1.183	1.874	0.672	1.194	2
1.192	1.687	0.777	1.192	2
1.175	1.504	0.602	1.193	2

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.157	1.328	0.618	1.183	5
1.186	0.954	0.652	1.200	4
1.179	0.773	0.604	1.198	1
1.168	0.590	0.553	1.168	1

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.151	0.394	0.447	1.163	1
1.144	0.204	0.411	1.199	1

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 0.600 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.203	2.045	0.821	1.265	2
1.217	1.879	1.266	1.229	2
1.224	1.689	1.420	1.224	2
1.211	1.499	1.162	1.230	2

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.205	1.325	1.315	1.220	5
1.206	1.143	1.199	1.206	5
1.212	0.960	1.006	1.225	4
1.209	0.783	1.057	1.229	1

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.199	0.591	0.994	1.200	1
1.183	0.388	0.885	1.196	1
1.175	0.195	0.723	1.232	1

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 0.700 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.233	2.095	1.581	1.296	2
1.248	1.885	2.325	1.260	2
1.254	1.692	2.643	1.254	2
1.245	1.494	2.204	1.264	2

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.245	1.326	2.783	1.259	5
1.242	1.147	2.133	1.242	5
1.243	0.968	1.668	1.254	4
1.239	0.790	1.787	1.259	1

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.230	0.592	1.782	1.231	1
1.214	0.383	1.678	1.228	1
1.210	0.186	1.235	1.267	1

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 0.800 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.257	2.105	2.947	1.326	2
1.282	1.890	3.832	1.294	2
1.287	1.694	4.451	1.288	2
1.278	1.491	4.118	1.297	2
1.290	1.327	6.059	1.294	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.276	1.149	3.917	1.276	5
1.273	0.976	2.863	1.283	4
1.269	0.796	3.325	1.290	1
1.260	0.593	3.491	1.261	1
1.244	0.378	3.338	1.258	1

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.242	0.178	2.088	1.301	1
1.497	2.076	0.209	1.541	2
1.508	1.868	0.235	1.516	2
1.510	1.676	0.241	1.511	2
1.517	1.502	0.248	1.532	2

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 0.900 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.307	2.115	3.693	1.367	2
1.331	1.898	3.523	1.344	2
1.339	1.696	3.693	1.339	2
1.327	1.492	4.204	1.345	2
1.330	1.326	9.066	1.344	5
1.321	1.154	5.088	1.321	5
1.310	0.977	3.840	1.320	4
1.316	0.790	4.106	1.335	1

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.311	0.588	3.451	1.311	1
1.291	0.375	4.201	1.305	1
1.277	0.171	3.301	1.336	1
1.515	2.082	0.391	1.559	2
1.532	1.871	0.482	1.540	2
1.336	1.677	0.528	1.537	2
1.537	1.499	0.431	1.579	5
1.543	1.330	0.624	1.555	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.540	1.145	0.489	1.540	5
1.540	0.948	0.408	1.551	4
1.540	0.763	0.412	1.553	1
1.545	0.579	0.393	1.545	1
1.531	0.394	0.354	1.541	1
1.517	0.207	0.368	1.559	1

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 6.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.2

PRESSURE FIELD   DIPOLE WEST/10   WFS/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.348	2.130	3.402	1.411	2	1.369	0.785	3.583	1.386	1	1.575	1.337	1.265	1.587	5
1.376	1.905	3.208	1.389	2	1.362	0.583	3.023	1.363	1	1.575	1.145	0.913	1.575	5
1.366	1.698	3.103	1.386	2	1.344	0.370	3.737	1.358	1	1.573	0.943	0.957	1.585	4
1.376	1.493	3.665	1.394	2	1.535	2.089	0.675	1.581	2	1.568	0.762	0.796	1.580	1
1.391	1.331	8.085	1.404	5	1.553	1.875	0.829	1.562	2	1.571	0.577	0.702	1.571	1
1.388	1.157	3.595	1.388	5	1.561	1.678	0.935	1.561	2	1.557	0.391	0.643	1.566	1
1.367	0.977	2.886	1.376	4	1.564	1.500	0.852	1.605	5	1.533	0.203	0.571	1.575	1

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 1.300 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.451	2.156	2.386	1.520	2	1.523	1.886	2.271	1.532	2	1.609	0.197	3.022	1.621	3
1.487	1.926	2.304	1.502	2	1.634	1.636	2.870	1.634	2	1.807	2.081	0.182	1.844	2
1.502	1.707	1.960	1.502	2	1.645	1.502	2.572	1.684	5	1.814	1.882	0.252	1.822	2
1.501	1.490	2.093	1.518	2	1.672	1.350	5.200	1.686	5	1.824	1.690	0.287	1.824	2
1.509	0.981	1.244	1.518	4	1.687	1.139	4.711	1.687	4	1.837	1.512	0.359	1.874	5
1.501	0.773	2.354	1.516	1	1.670	0.926	4.610	1.683	4	1.853	1.324	0.429	1.862	5
1.498	0.571	1.967	1.498	1	1.644	0.758	3.129	1.688	4	1.856	1.139	0.384	1.856	4
1.485	0.354	2.592	1.500	1	1.642	0.573	2.960	1.642	1	1.863	0.950	0.381	1.872	4
1.598	2.105	2.039	1.646	2	1.627	0.382	2.767	1.637	1	1.861	0.768	0.297	1.898	4

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 1.400 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.480	2.177	2.075	1.550	2	1.670	1.692	2.570	1.670	2	1.834	1.885	0.592	1.842	2
1.518	1.933	2.040	1.534	2	1.684	1.506	2.023	1.724	5	1.844	1.692	0.662	1.844	2
1.534	1.711	1.713	1.534	2	1.717	1.355	3.651	1.731	5	1.859	1.519	0.828	1.898	5
1.533	1.491	1.920	1.573	5	1.736	1.139	3.616	1.736	4	1.879	1.328	0.990	1.888	5
1.548	0.984	0.928	1.556	4	1.718	0.919	4.038	1.732	4	1.883	1.139	0.829	1.883	4
1.537	0.777	2.035	1.552	1	1.683	0.755	3.121	1.726	4	1.888	0.945	0.785	1.898	4
1.537	0.568	1.694	1.537	1	1.672	0.572	3.955	1.673	1	1.880	0.762	0.611	1.918	4
1.526	0.350	2.281	1.541	1	1.658	0.378	3.535	1.666	1	1.874	0.578	0.299	1.874	1
1.630	2.112	1.916	1.678	2	1.645	0.197	3.994	1.657	3	1.360	0.390	0.252	1.900	3
1.659	1.890	1.938	1.668	2	1.823	2.084	0.403	1.860	2	1.938	0.201	0.348	1.849	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 1.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.506	2.186	1.795	1.578	2	1.704	1.697	2.205	1.704	2	1.903	1.331	2.019	1.913	5
1.545	1.939	1.802	1.562	2	1.762	0.912	3.491	1.777	4	1.908	1.139	1.624	1.908	4
1.563	1.715	1.508	1.563	2	1.724	0.750	2.591	1.767	4	1.911	0.940	1.444	1.922	4
1.584	0.987	0.679	1.591	4	1.712	0.570	3.952	1.712	1	1.903	0.757	1.152	1.941	4
1.571	0.777	1.755	1.612	4	1.696	0.375	3.353	1.708	:	1.895	0.574	0.676	1.977	4
1.574	0.565	1.455	1.574	1	1.838	2.087	0.706	1.876	2	1.879	0.391	0.526	1.920	3
1.555	0.346	2.000	1.580	1	1.853	1.888	1.094	1.861	2	1.861	0.200	0.744	1.872	3
1.660	2.118	1.784	1.709	2	1.863	1.695	1.228	1.863	2					
1.692	1.894	1.667	1.702	2	1.881	1.525	1.660	1.921	5					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.3

PRESSURE FIELD   DIPOLE WEST/10   WES/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.612	2.226	0.863	1.692	2
1.655	1.971	0.969	1.676	2
1.674	1.735	0.885	1.675	2
1.704	0.736	0.814	1.740	4
1.725	0.559	0.665	1.725	1
1.787	2.154	1.113	1.841	2
1.826	1.921	0.841	1.837	2
1.847	1.715	0.761	1.847	2
1.940	0.893	1.569	1.956	4
1.898	0.735	1.168	1.931	4
1.890	0.549	2.106	1.890	1
1.879	0.355	1.998	1.912	3

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.954	2.113	1.201	1.994	2
1.979	1.918	2.020	1.989	2
2.012	1.722	1.807	2.095	5
2.057	1.559	1.757	2.099	5
2.081	1.357	2.079	2.093	5
2.091	1.135	1.443	2.091	4
2.087	0.912	1.776	2.100	4
2.068	0.723	1.958	2.110	4
2.043	0.553	2.194	2.126	4
2.019	0.373	3.053	2.053	3
2.008	0.194	2.461	2.017	3
2.099	2.071	1.207	2.130	2

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.114	1.838	1.347	2.122	2
2.140	1.714	2.490	2.216	5
2.172	1.525	3.093	2.206	5
2.188	1.336	2.891	2.197	5
2.202	1.140	2.332	2.202	5
2.204	0.943	3.209	2.213	4
2.191	0.756	2.801	2.224	4
2.176	0.558	1.729	2.252	4
2.156	0.377	1.394	2.188	3
2.140	0.194	1.010	2.149	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.100 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.630	2.233	0.749	1.711	2
1.674	1.976	0.862	1.694	2
1.692	1.739	0.812	1.692	2
1.725	0.790	0.694	1.760	4
1.749	0.558	0.566	1.749	1
1.808	2.161	0.928	1.863	2
1.847	1.927	0.740	1.859	2
1.868	1.719	0.625	1.868	2
1.969	0.891	1.337	1.984	4
1.914	0.734	1.015	1.957	4
1.920	0.547	1.877	1.920	1
1.910	0.352	1.775	1.942	3
1.979	2.120	1.074	2.020	2
2.005	1.925	1.765	2.016	2
2.040	1.728	1.503	2.123	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.087	1.564	1.493	2.130	5
2.112	1.361	1.793	2.124	5
2.123	1.135	1.226	2.123	4
2.120	0.907	1.586	2.133	4
2.101	0.717	1.830	2.142	4
2.076	0.548	2.041	2.158	4
2.053	0.368	2.921	2.086	3
2.043	0.192	2.136	2.052	3
2.114	2.075	2.064	2.144	2
2.134	1.891	1.975	2.141	2
2.167	1.722	2.891	2.244	5
2.201	1.530	3.582	2.235	5
2.217	1.339	3.231	2.226	5
2.231	1.141	2.581	2.231	5
2.233	0.941	3.966	2.242	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.219	0.752	3.420	2.252	4
2.197	0.555	2.740	2.273	4
2.175	0.374	2.551	2.207	3
2.162	0.193	1.828	2.170	3
2.328	1.886	0.140	2.446	5
2.352	1.698	0.180	2.418	5
2.376	1.520	0.197	2.406	5
2.395	1.345	0.193	2.404	5
2.401	1.161	0.209	2.402	5
2.409	0.969	0.217	2.415	4
2.392	0.780	0.166	2.419	4
2.380	0.593	0.154	2.442	4
2.380	0.403	0.088	2.414	3
2.355	0.209	0.113	2.365	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.200 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.647	2.240	0.652	1.729	2
1.690	1.982	0.771	1.711	2
1.708	1.743	0.749	1.709	2
1.744	0.793	0.590	1.778	4
1.772	0.559	0.461	1.772	1
1.828	2.168	0.893	1.884	2
1.867	1.933	0.653	1.880	2
1.965	0.889	1.143	2.011	4
1.939	0.734	0.886	1.981	4
1.947	0.545	1.708	2.035	4
1.939	0.350	1.557	1.970	3
2.002	2.127	0.961	2.045	2
2.029	1.932	1.546	2.041	2
2.141	1.364	1.549	2.153	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.153	1.135	1.046	2.153	4
2.151	0.904	1.406	2.164	4
2.131	0.712	1.678	2.174	4
2.108	0.543	1.870	2.190	4
2.086	0.362	2.634	2.117	3
2.076	0.169	1.876	2.085	3
2.135	2.080	2.516	2.156	2
2.161	1.897	2.013	2.169	2
2.201	1.731	2.331	2.279	5
2.236	1.537	2.746	2.271	5
2.254	1.343	2.457	2.253	5
2.268	1.142	1.915	2.268	5
2.269	0.939	3.349	2.278	4
2.255	0.748	2.841	2.298	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.233	0.549	2.479	2.309	4
2.211	0.370	2.593	2.241	3
2.193	0.192	2.295	2.201	3
2.323	2.075	0.135	2.351	2
2.343	1.892	0.367	2.461	5
2.371	1.704	0.447	2.437	5
2.396	1.524	0.498	2.427	5
2.415	1.347	0.499	2.424	5
2.423	1.161	0.543	2.423	5
2.429	0.969	0.556	2.435	4
2.410	0.779	0.391	2.437	4
2.401	0.590	0.414	2.462	4
2.397	0.401	0.298	2.430	3
2.369	0.208	0.293	2.378	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.4

PRESSURE FIELD   DIPOLE WEST/10   WFS/295   SMCKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.693	2.258	0.439	1.779	2
1.735	1.936	0.568	1.758	2
1.752	1.754	0.607	1.753	2
1.797	0.806	0.350	1.827	4
1.833	0.562	0.289	1.833	1
1.882	2.188	0.634	1.941	2
1.919	1.949	0.452	1.934	2
2.066	0.887	0.728	2.031	4
2.003	0.736	0.606	2.043	4
2.017	0.541	1.305	2.104	4
2.012	0.342	1.166	2.041	3
2.066	2.150	0.684	2.111	2
2.093	1.950	1.052	2.106	2
2.213	1.373	1.014	2.225	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.230	1.137	0.656	2.230	4
2.233	0.895	0.948	2.247	4
2.216	0.699	1.193	2.259	4
2.191	0.531	1.203	2.273	4
2.172	0.348	1.874	2.199	3
2.166	0.178	1.476	2.173	3
2.214	2.103	1.562	2.248	2
2.244	1.923	1.091	2.377	5
2.289	1.753	1.361	2.370	5
2.327	1.555	1.399	2.364	5
2.347	1.354	1.327	2.357	5
2.362	1.144	0.832	2.362	5
2.365	0.936	2.119	2.373	4
2.352	0.736	1.836	2.386	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.336	0.531	1.642	2.413	4
2.313	0.359	1.915	2.340	3
2.287	0.182	2.598	2.294	3
2.367	2.091	1.044	2.397	2
2.391	1.908	1.993	2.512	5
2.421	1.718	2.326	2.489	5
2.449	1.535	2.546	2.480	5
2.467	1.355	2.833	2.477	5
2.478	1.162	3.142	2.478	5
2.480	0.967	3.000	2.466	4
2.461	0.774	2.033	2.488	4
2.460	0.583	2.201	2.522	4
2.449	0.392	1.982	2.480	3
2.413	0.202	1.427	2.422	3

AVERACE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.600 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.709	2.264	0.388	1.794	2
1.749	2.001	0.521	1.772	2
1.766	1.757	0.572	1.766	2
1.813	0.810	0.290	1.842	4
1.850	0.564	0.243	1.850	1
1.897	2.195	0.566	1.958	2
1.935	1.953	0.400	1.950	2
2.036	0.688	0.632	2.101	4
2.022	0.737	0.539	2.061	4
2.038	0.540	1.194	2.123	4
2.033	0.340	1.069	2.061	3
2.085	2.157	0.606	2.131	2
2.111	1.555	0.927	2.125	2
2.233	1.376	0.886	2.246	5
2.252	1.139	0.962	2.252	4
2.258	0.893	0.825	2.271	4
2.242	0.696	1.055	2.285	4
2.215	0.528	1.021	2.298	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.197	0.345	1.710	2.224	3
2.193	0.175	1.379	2.200	3
2.237	2.110	1.330	2.272	2
2.268	1.930	0.910	2.402	5
2.314	1.760	1.167	2.396	5
2.353	1.561	1.146	2.391	5
2.373	1.357	1.131	2.383	5
2.389	1.146	0.693	2.389	5
2.393	0.935	1.838	2.401	4
2.382	0.733	1.636	2.416	4
2.367	0.526	1.487	2.445	4
2.344	0.356	1.678	2.370	3
2.317	0.179	2.338	2.324	3
2.390	2.100	1.113	2.422	2
2.421	1.918	1.791	2.543	5
2.453	1.729	1.941	2.523	5
2.482	1.542	2.066	2.515	5
2.502	1.360	2.252	2.511	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.511	1.165	2.607	2.512	5
2.512	0.967	2.744	2.518	4
2.493	0.771	1.800	2.520	4
2.492	0.580	2.260	2.554	4
2.480	0.333	2.074	2.511	3
2.441	0.200	1.567	2.449	3
2.595	2.077	0.203	2.760	5
2.608	1.881	0.242	2.712	5
2.639	1.704	0.261	2.699	5
2.662	1.531	0.261	2.691	5
2.670	1.358	0.275	2.679	5
2.684	1.165	0.251	2.684	5
2.676	0.970	0.254	2.681	4
2.669	0.776	0.246	2.693	4
2.669	0.602	0.279	2.722	4
2.653	0.399	0.252	2.683	3
2.632	0.204	0.187	2.639	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBCURING SMCKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.5

PRESSURE FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.761	2.285	0.248	1.851	2	2.440	1.578	0.552	2.480	5	2.748	1.369	1.691	2.758	5
1.799	2.016	0.400	1.825	2	2.458	1.369	0.672	2.469	5	2.759	1.170	1.421	2.759	5
1.815	1.768	0.475	1.816	2	2.478	1.151	0.249	2.478	5	2.752	0.970	1.439	2.757	4
1.869	0.829	0.110	1.855	4	2.489	0.933	1.089	2.497	4	2.743	0.771	1.337	2.767	4
1.910	0.574	0.114	1.992	4	2.484	0.719	1.145	2.519	4	2.741	0.598	1.638	2.793	4
1.953	2.218	0.364	2.017	2	2.483	2.139	0.742	2.520	2	2.723	0.392	1.905	2.751	3
1.989	1.970	0.245	2.006	2	2.523	1.954	1.023	2.652	5	2.694	0.191	1.450	2.701	3
2.158	0.891	0.383	2.172	4	2.561	1.762	0.951	2.635	5	2.852	2.073	0.125	3.001	5
2.096	0.746	0.354	2.123	4	2.593	1.564	0.979	2.628	5	2.885	1.885	0.159	2.980	5
2.105	0.543	0.893	2.167	4	2.614	1.375	1.047	2.624	5	2.912	1.704	0.138	2.966	5
2.103	0.336	0.740	2.130	3	2.623	1.175	1.337	2.623	5	2.911	1.525	0.193	2.937	5
2.150	2.184	0.346	2.201	2	2.624	0.965	1.703	2.630	4	2.907	1.351	0.286	2.915	5
2.174	1.974	0.570	2.190	2	2.605	0.759	1.083	2.632	4	2.916	1.167	0.206	2.916	5
2.302	1.387	0.553	2.316	5	2.608	0.567	2.169	2.670	4	2.931	0.973	0.213	2.936	4
2.325	1.143	0.292	2.325	5	2.600	0.374	1.848	2.627	3	2.916	0.785	0.259	2.937	4
2.342	0.888	0.460	2.355	4	2.557	0.189	1.658	2.564	3	2.890	0.585	0.225	2.943	4
2.331	0.698	0.619	2.374	4	2.654	2.103	1.207	2.824	5	2.884	0.388	0.162	2.910	3
2.316	2.140	0.697	2.355	2	2.676	1.908	1.644	2.784	5	2.888	0.195	0.102	2.895	3
2.346	1.955	0.484	2.484	5	2.711	1.726	1.567	2.775	5					
2.399	1.783	0.683	2.484	5	2.736	1.547	1.636	2.767	5					

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 3.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.818	2.308	0.158	1.913	2	2.580	0.932	0.641	2.538	4	2.861	0.378	1.460	2.886	3
1.858	2.031	0.352	1.886	2	2.582	0.709	0.850	2.618	4	2.836	0.174	1.271	2.842	3
1.873	1.778	0.395	1.874	2	2.572	2.171	0.341	2.772	5	2.900	2.092	1.173	3.053	5
1.931	0.654	-0.024	1.951	4	2.620	1.986	0.454	2.753	5	2.935	1.901	1.408	3.033	5
1.967	0.591	0.037	2.042	4	2.661	1.789	0.390	2.739	5	2.964	1.717	1.395	3.020	5
2.009	2.241	0.235	2.078	2	2.692	1.580	0.438	2.728	5	2.973	1.533	1.385	2.999	5
2.047	1.984	0.120	2.065	2	2.714	1.384	0.494	2.725	5	2.984	1.359	1.224	2.992	5
2.230	0.898	0.252	2.243	4	2.725	1.180	0.722	2.725	5	2.998	1.170	1.120	2.998	5
2.151	0.761	0.236	2.184	4	2.730	0.962	0.903	2.736	4	3.009	0.973	1.169	3.013	4
2.165	0.555	0.661	2.243	4	2.714	0.749	0.598	2.741	4	3.001	0.787	1.451	3.021	4
2.166	0.341	0.452	2.193	3	2.726	0.556	1.730	2.738	4	2.982	0.581	1.591	3.034	4
2.214	2.210	0.106	2.269	2	2.724	0.358	1.005	2.748	3	2.973	0.380	1.995	2.997	3
2.237	1.992	0.335	2.254	2	2.751	2.139	1.544	2.928	5	2.967	0.186	1.834	2.972	3
2.422	0.886	0.217	2.436	4	2.784	1.943	1.655	2.898	5	3.125	1.518	0.188	3.148	5
2.417	0.636	0.339	2.459	4	2.822	1.753	1.327	2.888	5	3.128	1.343	0.455	3.135	5
2.391	2.169	0.322	2.434	2	2.844	1.566	1.586	2.876	5	3.130	1.166	0.471	3.130	5
2.419	1.978	0.316	2.561	5	2.859	1.377	1.398	2.869	5	3.139	0.984	0.509	3.143	4
2.480	1.806	0.385	2.568	5	2.873	1.175	1.241	2.873	5	3.127	0.775	0.530	3.146	4
2.522	1.595	0.240	2.563	5	2.868	0.970	1.195	2.873	4	3.106	0.575	0.459	3.156	4
2.537	1.378	0.369	2.548	5	2.864	0.765	0.952	2.838	4	3.107	0.403	0.384	3.133	3
2.561	1.156	0.006	2.561	5	2.871	0.589	1.071	2.923	4	3.099	0.203	0.243	3.106	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 6.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.6

PRESSURE FIELD   DIPOLE WEST/10 WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 4.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.869	2.327	0.129	1.968	2
1.914	2.042	0.350	1.942	2
1.927	1.786	0.332	1.929	2
1.984	0.876	-0.103	2.001	4
2.010	0.611	0.006	2.078	4
2.057	2.258	0.192	2.123	2
2.094	1.993	0.032	2.117	2
2.291	0.907	0.204	2.303	4
2.204	0.777	0.174	2.233	4
2.208	0.571	0.507	2.280	4
2.210	0.352	0.263	2.238	3
2.265	2.228	-0.056	2.322	2
2.289	2.006	0.237	2.308	2
2.485	0.889	0.110	2.498	4
2.481	0.690	0.235	2.521	4
2.448	2.188	0.195	2.493	2
2.477	1.995	0.360	2.621	5
2.542	1.824	0.227	2.633	5
2.585	1.609	0.110	2.628	5
2.600	1.385	0.150	2.612	5
2.627	1.160	-0.105	2.627	5
2.648	0.933	0.448	2.656	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.654	0.708	0.670	2.638	4
2.636	2.190	0.109	2.839	5
2.691	2.007	0.176	2.828	5
2.735	1.807	0.139	2.815	5
2.766	1.592	0.211	2.803	5
2.789	1.392	0.261	2.800	5
2.801	1.182	0.504	2.801	5
2.807	0.961	0.566	2.813	4
2.794	0.745	0.377	2.822	4
2.818	0.554	1.337	2.878	4
2.834	2.167	1.248	3.016	5
2.876	1.970	0.907	2.994	5
2.912	1.772	0.767	2.980	5
2.930	1.552	1.083	2.964	5
2.946	1.379	0.801	2.956	5
2.961	1.171	0.956	2.961	5
2.960	0.970	0.741	2.965	4
2.959	0.761	0.544	2.983	4
2.974	0.587	0.751	3.025	4
2.972	0.376	1.375	2.996	3
2.955	0.170	1.119	2.960	3
2.994	2.122	1.048	3.151	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.040	1.932	1.053	3.142	5
3.070	1.745	0.886	3.129	5
3.072	1.543	0.786	3.100	5
3.080	1.360	0.549	3.088	5
3.104	1.170	0.740	3.105	5
3.116	0.973	0.781	3.120	4
3.114	0.784	0.912	3.134	4
3.099	0.575	0.953	3.150	4
3.091	0.375	1.587	3.114	3
3.090	0.181	1.183	3.095	3
3.133	2.094	1.434	3.275	5
3.172	1.917	1.971	3.266	5
3.196	1.728	1.002	3.250	5
3.203	1.523	0.667	3.226	5
3.217	1.346	1.068	3.224	5
3.225	1.168	1.180	3.226	5
3.234	0.985	1.383	3.238	4
3.228	0.774	1.256	3.249	4
3.209	0.568	1.167	3.259	4
3.205	0.396	1.199	3.229	3
3.197	0.192	1.674	3.203	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 4.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.964	2.051	0.318	1.993	2
1.977	1.794	0.261	1.979	2
2.029	0.896	-0.155	2.043	4
2.043	0.629	-0.011	2.106	4
2.101	2.270	0.194	2.173	2
2.147	2.000	-0.040	2.166	2
2.343	0.917	0.137	2.354	4
2.249	0.792	0.123	2.275	4
2.240	0.587	0.386	2.307	4
2.242	0.365	0.143	2.272	3
2.308	2.240	-0.152	2.368	2
2.337	2.019	0.213	2.357	2
2.538	0.895	0.065	2.549	4
2.530	0.697	0.211	2.563	4
2.492	2.198	0.216	2.538	2
2.527	2.010	0.525	2.673	5
2.595	1.842	0.150	2.689	5
2.641	1.623	0.049	2.685	5
2.658	1.392	-0.014	2.670	5
2.683	1.165	-0.151	2.683	5
2.703	0.933	0.364	2.711	4
2.709	0.715	0.524	2.742	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.583	2.203	-0.002	2.887	5
2.745	2.024	0.090	2.885	5
2.792	1.823	0.023	2.875	5
2.826	1.604	0.109	2.864	5
2.849	1.400	0.145	2.861	5
2.862	1.184	0.453	2.862	5
2.866	0.964	0.484	2.871	4
2.855	0.749	0.287	2.881	4
2.891	0.561	1.104	2.948	4
2.899	2.190	0.818	3.084	5
2.944	1.990	0.518	3.065	5
2.990	1.789	0.472	3.050	5
2.998	1.597	0.747	3.033	5
3.014	1.395	0.432	3.024	5
3.027	1.171	0.699	3.027	5
3.029	0.970	0.473	3.034	4
3.032	0.762	0.311	3.055	4
3.057	0.591	0.520	3.105	4
3.059	0.380	1.215	3.083	3
3.049	0.167	0.961	3.053	3
3.072	2.150	0.720	3.235	5
3.123	1.952	0.740	3.227	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.153	1.763	0.583	3.214	5
3.148	1.560	0.656	3.176	5
3.157	1.365	0.219	3.165	5
3.187	1.172	0.489	3.187	5
3.200	0.976	0.479	3.204	4
3.202	0.785	[illegible]	3.222	4
3.192	0.575	0.655	3.242	4
3.184	0.370	1.069	3.206	3
3.169	0.172	0.754	3.193	3
3.218	2.119	1.203	3.364	5
3.267	1.942	1.316	3.364	5
3.289	1.744	0.466	3.344	5
3.287	1.532	0.419	3.310	5
3.305	1.354	0.824	3.312	5
3.323	1.174	0.611	3.323	5
3.335	0.990	0.723	3.338	4
3.329	0.776	0.731	3.349	4
3.311	0.564	0.837	3.360	4
3.309	0.384	0.691	3.331	3
3.310	0.182	1.329	3.315	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.7

PRESSURE FIELD DIPOLE WEST/10 WF5/295 SMOKE PUFF GRID 1209 /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.004	2.060	0.206	2.034	2	2.756	0.725	0.400	2.757	4	3.131	2.171	0.476	3.297	5
2.019	1.803	0.180	2.021	2	2.721	2.214	-0.046	2.926	5	3.183	1.963	0.560	3.289	5
2.061	0.912	-0.202	2.073	4	2.791	2.039	0.036	2.933	5	3.213	1.779	0.399	3.276	5
2.069	0.644	-0.042	2.127	4	2.841	1.838	-0.034	2.926	5	3.208	1.574	0.570	3.237	5
2.140	2.291	0.197	2.214	2	2.878	1.618	0.057	2.918	5	3.220	1.375	0.031	3.229	5
2.191	2.008	-0.107	2.211	2	2.902	1.409	0.079	2.914	5	3.250	1.179	0.234	3.251	5
2.389	0.927	0.035	2.398	4	2.915	1.189	0.474	2.915	5	3.263	0.980	0.296	3.266	4
2.285	0.805	0.062	2.309	4	2.916	0.972	0.515	2.921	4	3.270	0.791	0.492	3.288	4
2.265	0.601	0.291	2.328	4	2.905	0.759	0.242	2.930	4	3.267	0.583	0.439	3.314	4
2.266	0.375	0.069	2.297	3	2.950	0.574	1.012	3.003	4	3.261	0.371	0.864	3.282	3
2.347	2.251	-0.194	2.408	2	2.949	2.209	0.547	3.138	5	3.263	0.169	0.989	3.268	3
2.382	2.033	0.219	2.403	2	2.995	2.007	0.426	3.118	5	3.282	2.142	0.853	3.432	5
2.555	0.902	0.026	2.596	4	3.033	1.806	0.376	3.105	5	3.333	1.960	1.167	3.432	5
2.572	0.705	0.191	2.608	4	3.054	1.611	0.591	3.090	5	3.355	1.756	0.310	3.411	5
2.528	2.206	0.336	2.576	2	3.070	1.395	0.275	3.080	5	3.354	1.546	0.292	3.379	5
2.572	2.025	0.701	2.721	5	3.080	1.177	0.525	3.080	5	3.377	1.368	0.689	3.385	5
2.644	1.859	0.140	2.740	5	3.082	0.975	0.381	3.086	4	3.398	1.183	0.306	3.398	5
2.692	1.639	0.003	2.738	5	3.088	0.771	0.202	3.110	4	3.409	0.994	0.432	3.412	4
2.712	1.402	-0.106	2.725	5	3.123	0.602	0.354	3.168	4	3.407	0.782	0.502	3.426	4
2.735	1.171	-0.160	2.736	5	3.132	0.385	0.799	3.155	3	3.394	0.568	0.591	3.442	4
2.752	0.947	0.310	2.759	4	3.125	0.172	0.832	3.129	3	3.391	0.383	0.351	3.412	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 5.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.031	2.069	0.039	2.062	2	2.798	0.960	0.239	2.804	4	3.176	2.188	0.355	3.344	5
2.048	1.815	0.099	2.051	2	2.800	0.735	0.299	2.829	4	3.229	1.984	0.456	3.338	5
2.079	0.925	-0.253	2.089	4	2.756	2.227	-0.060	2.964	5	3.260	1.796	0.296	3.325	5
2.086	0.655	-0.097	2.141	4	2.831	2.056	-0.031	2.976	5	3.256	1.589	0.449	3.287	5
2.173	2.293	0.173	2.249	2	2.886	1.855	-0.071	2.974	5	3.273	1.389	-0.045	3.282	5
2.230	2.019	-0.169	2.251	2	2.926	1.633	0.019	2.968	5	3.300	1.190	0.057	3.300	5
2.425	0.935	-0.096	2.434	4	2.949	1.420	0.031	2.962	5	3.312	0.989	0.212	3.315	4
2.313	0.815	-0.012	2.335	4	2.961	1.200	0.490	2.962	5	3.325	0.803	0.398	3.342	4
2.284	0.611	0.223	2.344	4	2.964	0.986	0.529	2.967	4	3.329	0.595	0.268	3.373	4
2.286	0.379	0.025	2.317	3	2.951	0.772	0.182	2.973	4	3.332	2.160	0.649	3.486	5
2.379	2.264	-0.205	2.442	2	3.001	0.588	1.024	3.050	4	3.385	1.977	1.054	3.488	5
2.424	2.050	0.218	2.589	5	2.991	2.227	0.458	3.183	5	3.410	1.774	0.154	3.468	5
2.628	0.909	-0.047	2.638	4	3.036	2.026	0.457	3.163	5	3.409	1.564	0.120	3.436	5
2.611	0.712	0.120	2.646	4	3.077	1.824	0.354	3.152	5	3.435	1.382	0.556	3.444	5
2.561	2.215	0.495	2.609	2	3.102	1.625	0.529	3.140	5	3.455	1.192	0.166	3.455	5
2.612	2.041	0.741	2.764	5	3.116	1.408	0.249	3.128	5	3.465	1.001	0.344	3.468	4
2.688	1.876	0.129	2.788	5	3.125	1.199	0.473	3.126	5	3.470	0.791	0.385	3.487	4
2.740	1.656	-0.052	2.788	5	3.128	0.986	0.391	3.131	4	3.463	0.578	0.387	3.509	4
2.762	1.416	-0.122	2.776	5	3.136	0.783	0.139	3.156	4	3.458	0.390	0.141	3.480	3
2.783	1.181	-0.147	2.784	5	3.178	0.617	0.259	3.220	4					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.0718 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 3.3742 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.8

PRESSURE FIELD   DIPOLE WEST/10   WF5/295   SMOKE PUFF GRID 1209   /A770322

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 6.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.046	2.080	-0.103	2.079	2
2.065	1.828	0.031	2.069	2
2.082	0.935	-0.305	2.092	4
2.095	0.663	-0.166	2.148	4
2.259	2.032	-0.210	2.282	2
2.450	0.943	-0.229	2.458	4
2.329	0.822	-0.089	2.350	4
2.295	0.616	0.180	2.354	4
2.299	0.380	0.002	2.331	3
2.401	2.280	-0.236	2.467	2
2.458	2.067	0.174	2.628	5
2.664	0.916	-0.163	2.673	4
2.645	0.715	-0.001	2.679	4
2.559	2.228	0.576	2.640	2
2.647	2.054	0.615	2.801	5
2.729	1.891	0.320	2.831	5
2.783	1.672	-0.119	2.834	5
2.805	1.434	-0.083	2.921	5
2.824	1.194	-0.134	2.825	5
2.840	0.974	0.139	2.844	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.842	0.742	0.215	2.870	4
2.791	2.242	-0.061	3.001	5
2.869	2.073	-0.133	3.017	5
2.929	1.872	-0.109	3.019	5
2.970	1.648	-0.022	3.014	5
2.990	1.431	-0.022	3.004	5
3.003	1.215	0.432	3.004	5
3.010	1.003	0.425	3.013	4
2.993	0.783	0.078	3.014	4
3.045	0.598	1.092	3.093	4
3.029	2.246	0.486	3.226	5
3.077	2.046	0.444	3.205	5
3.119	1.841	0.308	3.197	5
3.145	1.636	0.479	3.184	5
3.158	1.420	0.287	3.170	5
3.169	1.205	0.518	3.170	5
3.172	1.002	0.413	3.175	4
3.180	0.795	0.069	3.199	4
3.224	0.630	0.229	3.264	4
3.215	2.205	0.347	3.387	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.270	2.003	0.400	3.383	5
3.301	1.814	0.280	3.369	5
3.296	1.603	0.387	3.328	5
3.315	1.400	0.000	3.325	5
3.342	1.205	0.010	3.342	5
3.356	1.003	0.186	3.358	4
3.373	0.818	0.303	3.368	4
3.380	0.608	0.148	3.421	4
3.374	2.178	0.561	3.531	5
3.431	1.995	0.906	3.536	5
3.456	1.793	0.006	3.518	5
3.453	1.580	-0.065	3.481	5
3.480	1.392	0.386	3.489	5
3.500	1.201	0.089	3.501	5
3.513	1.011	0.298	3.515	4
3.524	0.804	0.265	3.540	4
3.521	0.589	0.232	3.563	4
3.516	0.398	-0.011	3.539	3

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 6.500 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.053	2.092	-0.141	2.098	2
2.073	1.839	-0.016	2.077	2
2.076	0.943	-0.344	2.085	4
2.091	0.669	-0.220	2.143	4
2.273	2.044	-0.205	2.297	2
2.459	0.950	-0.326	2.466	4
2.332	0.827	-0.153	2.353	4
2.295	0.619	0.146	2.354	4
2.302	0.382	0.000	2.334	3
2.480	2.075	0.052	2.651	5
2.686	0.922	-0.287	2.694	4
2.665	0.716	-0.114	2.699	4
2.613	2.239	0.451	2.666	2
2.675	2.062	0.503	2.830	5
2.763	1.899	0.451	2.865	5
2.820	1.684	-0.173	2.873	5
2.838	1.446	-0.079	2.854	5
2.854	1.205	-0.170	2.855	5
2.870	0.983	0.051	2.875	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.873	0.744	0.112	2.900	4
2.822	2.253	-0.050	3.034	5
2.900	2.085	-0.242	3.051	5
2.968	1.884	-0.146	3.060	5
3.010	1.660	-0.066	3.055	5
3.027	1.442	-0.089	3.042	5
3.038	1.230	0.282	3.040	5
3.048	1.016	0.223	3.051	4
3.029	0.788	-0.055	3.049	4
3.082	0.601	1.137	3.129	4
3.065	2.264	0.452	3.265	5
3.118	2.064	0.312	3.253	5
3.160	1.856	0.232	3.240	5
3.187	1.646	0.421	3.227	5
3.198	1.431	0.344	3.211	5
3.213	1.222	0.501	3.214	5
3.215	1.018	0.351	3.217	4
3.220	0.803	-0.014	3.237	4
3.261	0.639	0.237	3.299	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.253	2.225	0.375	3.430	5
3.311	2.020	0.359	3.426	5
3.340	1.828	0.317	3.410	5
3.330	1.611	0.438	3.364	5
3.352	1.410	0.153	3.363	5
3.361	1.219	0.070	3.382	5
3.398	1.018	0.152	3.400	4
3.415	0.830	0.229	3.429	4
3.420	0.619	0.063	3.459	4
3.412	2.195	0.545	3.572	5
3.470	2.011	0.812	3.578	5
3.493	1.806	-0.079	3.556	5
3.487	1.589	-0.158	3.516	5
3.516	1.401	0.302	3.526	5
3.539	1.212	0.059	3.540	5
3.556	1.023	0.236	3.558	4
3.570	0.817	0.151	3.585	4
3.566	0.598	0.114	3.606	4

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